

**THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicant(s): Volker Deichmann  
Appl. No.: 10/019,329  
Conf. No.: 6261  
Filed: May 9, 2002  
Title: MOBILE PHONE WITH EXPANDED TELEPHONE DIRECTORY  
Art Unit: 2618  
Examiner: Tuan A. Tran  
Docket No.: 112740-372

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**APPELLANTS' APPEAL BRIEF**

Sir:

Appellants submit this Appeal Brief in support of the Notice of Appeal filed on April 20, 2006. This Appeal is taken from the Final Rejection in the Office Action dated October 20, 2005, the Advisory Action dated February 23, 2006, and Notice of Panel Decision from Pre-Appeal Brief Review dated August 16, 2006.

**I. REAL PARTY IN INTEREST**

The real party in interest for the above-identified patent application on Appeal is Siemens Aktiengesellschaft ("Siemens AG") by virtue of an Assignment dated May 9, 2002 and recorded at reel 012966, frame 0936 in the United States Patent and Trademark Office.

## **II. RELATED APPEALS AND INTERFERENCES**

Appellants' legal representative and the Assignee of the above-identified patent application do not know of any prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision with respect to the above-identified Appeal.

### **III. STATUS OF CLAIMS**

Claims 9-16 are pending in the above-identified patent application. Claims 9-16 stand rejected. Therefore, Claims 9-16 are being appealed in this Brief. A copy of the appealed claims is included in the Claims Appendix.

#### **IV. STATUS OF AMENDMENTS**

A Final Office Action was mailed on October 20, 2005. Appellants filed a Response on January 20, 2006 in reply to the Final Office Action. An Advisory Action was mailed on February 23, 2006. In the Advisory Action, the Response was considered but was deemed not to place the patent application in condition for allowance. A copy of the Final Office Action is attached as Exhibit A in the Evidence Appendix, and a copy of the Advisory Action is attached as Exhibit B in the Evidence Appendix.

## **V. SUMMARY OF CLAIMED SUBJECT MATTER**

A summary of the invention by way of reference to the drawings and specification for each of the independent claims is provided as follows:

Independent Claim 9 is generally directed to a mobile phone, comprising a nonvolatile memory (ref. 10; page 6, lines 4-6), a SIM card (ref. 2; page 6, lines 7-11), and at least one electronic telephone directory (15) stored in a memory of the SIM card and another directory (13-14) being stored in the non-volatile memory, where a number of attributes including telephone numbers and names of the at least one telephone directory are prescribed by the SIM card (page 6, line 15 - page 7, line 16). Also, at least one database is stored in the nonvolatile memory and is respectively assigned to one of the at least one electronic telephone directory, wherein each entry of a telephone directory is assigned to a corresponding database entry having a data field of variable size with respect to a number of additional attributes assigned to the telephone directory entry (page 3, line 24 - page 4, line 10; page 7, lines 1-14).

Although specification citations are given in accordance with C.F.R. 1.192(c), these reference numerals and citations are merely examples of where support may be found in the specification for the terms used in this section of the Brief. There is no intention to suggest in any way that the terms of the claims are limited to the examples in the specification. As demonstrated by the citations above, the claims are fully supported by the specification as required by law. However, it is improper under the law to read limitations from the specification into the claims. Pointing out specification support for the claim terminology as is done here to comply with rule 1.192(c) does not in any way limit the scope of the claims to those examples from which they find support. Nor does this exercise provide a mechanism for circumventing the law precluding reading limitations into the claims from the specification. In short, the specification citations are not to be construed as claim limitations or in any way used to limit the scope of the claims.

**VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

1. Claims 9-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Holmstrom et al.* (WO 98/30053) in view of *Iwata et al.* (US Patent 6,009,338). Copies of *Holmstrom* and *Iwata* are attached herewith as Exhibits C and D, respectively.

## VII. ARGUMENT

### A. LEGAL STANDARDS

#### Obviousness under 35 U.S.C. §103

The Federal Circuit has held that the legal determination of an obviousness rejection under 35 U.S.C. § 103 is:

whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made...The foundational facts for the *prima facie* case of obviousness are: (1) the scope and content of the prior art; (2) the difference between the prior art and the claimed invention; and (3) the level of ordinary skill in the art...Moreover, objective indicia such as commercial success and long felt need are relevant to the determination of obviousness...Thus, each obviousness determination rests on its own facts.

*In re Mayne*, 41 U.S.P.Q. 2d 1451, 1453 (Fed. Cir. 1997).

In making this determination, the Patent Office has the initial burden of proving a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q. 2d 1955, 1956 (Fed. Cir. 1993). This burden may only be overcome “by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings.” *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). “If the examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent.” *In re Oetiker*, 24 U.S.P.Q. 2d 1443, 1444 (Fed. Cir. 1992).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference or references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *In re Fine*, 837 F.2d 1071, 5, U.S.P.Q.2d 1596 (Fed. Cir. 1988). Second there must be a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Finally, all of the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974).

Further, it is improper to use an invention as a template for its own reconstruction based on hindsight knowledge of the patented invention when the prior art does not contain or suggest

that knowledge. *Sensonics, Inc. v. Aerosonic Corp.*, 38 U.S.P.Q.2d 1551, 1554 (Fed. Cir. 1996). “One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). In this regard, the invention “must be viewed not after the blueprint has been drawn by the inventor, but as it would have been perceived in the state of the art that existed at the time the invention was made.” *Id.* As such, the Federal Circuit has acknowledged the need for “rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.” *In re Dembiczaik*, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999).

Moreover, the Federal Circuit has held that “obvious to try” is not the proper standard under 35 U.S.C. §103. *Ex parte Goldgaber*, 41 U.S.P.Q.2d 1172, 1177 (Fed. Cir. 1996). “An obvious-to-try situation exists when a general disclosure may pique the scientist curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result, or that the claimed result would be obtained if certain directions were pursued.” *In re Eli Lilly and Co.*, 14 U.S.P.Q.2d 1741, 1743 (Fed. Cir. 1990).

Of course, references must be considered as a whole and those portions teaching against or away from the claimed invention must be considered. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve Inc.*, 796 F.2d 443 (Fed. Cir. 1986). “A prior art reference may be considered to teach away when a person of ordinary skill, upon reading the reference would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the Applicant.” *Monarch Knitting Machinery Corp. v. Fukuhara Industrial Trading Co., Ltd.*, 139 F.3d 1009 (Fed. Cir. 1998), quoting, *In re Gurley*, 27 F.3d 551 (Fed. Cir. 1994).

#### B. THE CLAIMED INVENTION

Independent Claim 9 is directed, in part, to a mobile phone having a nonvolatile memory, SIM card, at least one electronic telephone directory stored in the SIM card having attributes that are prescribed by the SIM card, and “at least one database stored in the nonvolatile memory and, each of the at least one database being respectively assigned to one of the at least one electronic telephone directory, wherein each entry of a telephone directory is assigned to a corresponding

database entry having a data field of variable size with respect to a number of additional attributes assigned to the telephone directory entry” (emphasis added).

Under the recited configuration, the non-volatile memory comprises at least one data base, wherein each of the at least one data base is respectively assigned to one of the telephone directories in the SIM card or to a further telephone directory in a non-volatile memory. Furthermore, by structuring the directories this way, each entry of a telephone directory is assigned to a corresponding data base entry having a data field of variable size with respect to a number of additional attributes assigned to the telephone directory entry. Thus, it is possible to improve the format of the number of attributes which has been previously prescribed by the SIM card.

C. THE REJECTION OF CLAIMS 9-16 UNDER 35 U.S.C. §103(a) TO HOLMSTOM AND IWATA SHOULD BE REVERSED BECAUSE THE EXAMINER HAS NOT ESTABLISHED A PRIMA FACIE CASE OF OBVIOUSNESS

1. One having ordinary skill in the art would not be motivated to combine the cited references to arrive at the present claims

Appellants respectfully submit that, because *Holmstrom* and *Iwata* are directed towards inventions with different objectives that teach away from each other and the present invention, the skilled artisan would not be motivated to modify or combine them to arrive at the present claims. In fact, the Federal Circuit has held that it is “impermissible to use the claimed invention as an instruction manual or ‘template’ to piece together the teachings of the prior art so that the claimed invention is rendered obvious.” *In re Fritch*, 23 U.S.P.Q.2d 1780, 1784 (Fed. Cir. 1992). Indeed, references must be considered as a whole and those portions teaching against or away from the claimed invention must be considered. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve Inc.*, 796 F.2d 443 (Fed. Cir. 1986).

The disclosure in *Holmstrom* is directed to memory management a mobile communication unit, where the phone book allows selection of more than one item stored in the phone book and to enable selection of an operation in the phone book to be executed on all items selected (page 1, lines 18-29). Thus, for example, a user may select multiple entries in the phone

book and perform a store, copy, erase, call and conference call function on the selections (page 2, lines 18-23; page 3, line 10 - page 4, line 31). *Holmstrom* teaches that flagged names or telephone numbers in the phone book that have abbreviated numbers are stored in the non-volatile memory (EEPROM), while non-flagged entries are stored in the SIM card (page 3, lines 5-8). Accordingly, *Holmstrom* performs memory management for the phone book by separating SIM and EEPROM entries and performing abbreviated dialing functions according to the selected function and the location of the entry (page 4, lines 5-31).

In contrast, *Iwata* discloses mobile information terminal equipment which also functions as an electronic note, word processor, or personal computer, where the address book is integrated into a RAM memory of a PDA-type architecture (col. 13, lines 9-34). *Iwata* discloses a mobile phone providing an address book where the user is provided with a list of names for an overview of certain address book entries according to a chosen index, wherein by double touching one of the list entries a corresponding address to this entry is scrolled and displayed (col. 14, line 4 - col. 15, line 13; see FIGs. 6 and 7). This configuration in *Iwata* merely discloses a scrolling function for locating stored names within an address book through their alphabetical order (A-Z) or their Japanese/English phonetic equivalent ("KA," "SA," "TA," etc.) (col. 14, lines 26-42). Aside from the fact that *Iwata* does not disclose the use of SIM cards, there is no teaching, suggestion or motivation for one having ordinary skill in the art to rely on the PDA/RAM architecture of *Iwata*'s address book to perform Japanese Kanji phonetic translations of address book entries in the teaching of *Holmstrom*. Moreover, the problem to be solved in *Iwata* is specifically directed to memory management in the context of touch-screen LCD's (col. 4, lines 40-52; col. 5, lines 22-42) - none of these considerations are present in the disclosure of *Holmstrom*.

Appellants also respectfully submit that if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). This certainly applies here where one of the cited references is entirely directed to a SIM/EEPROM management of phone book entries (*Holmstrom*) and the other cited reference is entirely directed to a RAM memory implementation of a mobile computing device (*Iwata*). As a result, the final products of *Holmstrom* and *Iwata* are completely distinct, made by different processes and intended for different purposes. Moreover,

because of these differences, one skilled in the art would not be motivated to modify or combine *Holmstrom* and *Iwata* to arrive at the present claims.

To arrive at the claimed invention, it is respectfully submitted that the Examiner has impermissibly used hindsight to piece together the cited art and has selectively picked and chosen teachings of each of the references in an attempt to explain what the claimed invention discloses. For at least the reasons discussed above, the combination of the cited references is improper and thus, fails to render Claims 9-16 obvious.

2. Even if there were a motivation to combine, the cited references fail to disclose or suggest all of the elements of the claimed invention

As mentioned above, independent Claim 9 is directed, in part, to a mobile phone having a nonvolatile memory, SIM card, at least one electronic telephone directory stored in the SIM card having attributes that are prescribed by the SIM card, and “at least one database stored in the nonvolatile memory and, each of the at least one database being respectively assigned to one of the at least one electronic telephone directory, wherein each entry of a telephone directory is assigned to a corresponding database entry having a data field of variable size with respect to a number of additional attributes assigned to the telephone directory entry.” The present claims address the internal data format of a SIM/nonvolatile memory configuration for storing telephone directory entries, where the GSM standard requires that a telephone directory entry be composed of a sequence of numbers (telephone number) and an associated sequence of alphanumeric characters (name). The same format is also used for telephone directory entries that are located in the nonvolatile memory. Under the standard, the number of attributes or features of a telephone directory entry (i.e., a telephone number or a name) is limited to two. Because of this limitation in attributes for telephone entries of an SIM card, flexible use of the telephone directory of a mobile phone (for example, the grouping of telephone numbers according to certain properties such as “work” or “personal”), is needed.

Accordingly, claim 9 recites a telephone directory stored in a SIM card and another directory (if there is more than one), stored in non-volatile memory, where the telephone directory has its attributes prescribed by the SIM card. Claim 9 further recites at least one database stored in non-volatile memory that corresponds to a respective telephone directory, where each database has a data field of variable size with respect to a number of additional attributes assigned to the telephone directory entry. Accordingly, the format of the number of attributes which has been previously prescribed by the SIM card can be expanded via the “additional” attributes (such as grouping telephone numbers according to certain properties such as “work” or “personal”).

As was previously conceded, *Holmstrom* does not teach an electronic data base assigned to the telephone directory in the SIM card in order to expand the prescribed structure of the

telephone directory in the SIM card with respect to the structure of the telephone directory entries (see Final Office Action dated October 20, 2005: page 2, paragraph 1).

However, *Iwata* fails to solve the deficiencies of *Holmstrom*. As was discussed above, *Iwata* discloses a mobile phone providing an address book where the user is provided with a list of names for an overview of certain address book entries according to a chosen index, wherein by double touching one of the list entries a corresponding address to this entry is scrolled and displayed (col. 14, line 4 – col. 15, line 13; see FIGs. 6 and 7). This configuration in *Iwata* merely discloses a scrolling function for locating stored names within an address book through their alphabetical order (A-Z) or their Japanese/English phonetic equivalent (“KA,” SA,” “TA,” etc.) (col. 14, lines 26-42). Thus, the display in *Iwata* is directed towards the same attribute (i.e., name), and does not provide for any additional attributes. *Iwata* also does not disclose a database being respectively assigned to one of the at least one electronic telephone directory as required in the present claims. Furthermore, *Iwata* is completely silent regarding the memory structure and does not disclose the use of SIM cards, instead disclosing that lists are stored within RAM memory 25 (col. 13, lines 19-21; col. 18, lines 9-20; FIG. 30 – col. 26, lines 29-48). As such, the reference does not disclose at least one data base stored in a non-volatile memory, wherein the at least one database is assigned to one specific electronic telephone directory to expand the telephone book structure.

For at least the reasons discussed above, the cited references, alone or in combination, do not teach, suggest, or even disclose all of the elements of Claim 9, and thus, fail to render the claimed subject matter obvious for at least these reasons. Accordingly, Appellants respectfully submit that Claim 9 and Claims 10-16 that depend directly and indirectly from Claim 9 are novel, nonobvious and distinguishable from the cited references and are in condition for allowance.

### VIII. CONCLUSION

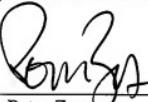
Appellants respectfully submit that Claims 9-16 are non-obvious in view of the cited references for the reasons previously discussed. Accordingly, Appellants respectfully submit that the rejections under 35 U.S.C. §103(a) are erroneous in law and in fact and should therefore be reversed by this Board.

The Director is authorized to charge \$500 for the Appeal Brief and any additional fees which may be required, or to credit any overpayment to Deposit Account No. 02-1818. If such a withdrawal is made, please indicate the Attorney Docket No. 112740-372 on the account statement.

Respectfully submitted,

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BY



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Dated: September 18, 2006

**CLAIMS APPENDIX**

**PENDING CLAIMS ON APPEAL OF  
U.S. PATENT APPLICATION SERIAL NO. 10/448,980**

Claims 1-8. (canceled).

Claim 9. A mobile phone, comprising:

a nonvolatile memory;  
an SIM card;

at least one electronic telephone directory, one of the at least one of the electronic telephone directory being stored in a memory of the SIM card and another of the at least one electronic telephone directory, if applicable, being stored in the non -volatile memory, a number of attributes including telephone numbers and names of the at least one telephone directory being prescribed by the SIM card; and

at least one database stored in the nonvolatile memory and, each of the at least one database being respectively assigned to one of the at least one electronic telephone directory, wherein each entry of a telephone directory is assigned to a corresponding database entry having a data field of variable size with respect to a number of additional attributes assigned to the telephone directory entry.

Claim 10. A mobile phone as claimed in claim 9, wherein each telephone directory is assigned precisely one database.

Claim 11. A mobile phone as claimed in claim 9, wherein each database has a key associated with the respective assignment between the database and the associated telephone directory.

Claim 12. A mobile phone as claimed in claim 9, wherein each of the database entries includes a characteristic diagram which points to the corresponding telephone directory entry in the corresponding telephone directory.

Claim 13. A mobile phone as claimed in claim 12, wherein the characteristic diagram of the database entry contains the corresponding telephone number.

Claim 14. A mobile phone as claimed in claim 12, wherein the data field of a database entry contains the additional attributes of the telephone number of the corresponding telephone directory.

Claim 15. A mobile phone as claimed in claim 9, wherein the at least one database is an expansion telephone directory.

Claim 16. A mobile phone as claimed in claim 15, wherein the expansion telephone directory stored in the nonvolatile memory differs in format from the electronic telephone directory stored on the SIM card, there being an internally assigned expansion telephone directory for each electronic telephone directory, and the expansion telephone directory being assigned by an IMSI to the electronic telephone directory.

## **EVIDENCE APPENDIX**

EXHIBIT A: Final Office Action dated October 20, 2005.

EXHIBIT B: Advisory Action dated February 23, 2006.

EXHIBIT C: WO 98/30053 to Holmstrom et al. ("Holmstrom"), cited by the Examiner in the Office Action dated October 20, 2005.

EXHIBIT D: US Patent No. 6,009,338 to Iwata ("Iwata"), cited by the Examiner in the Office Action dated October 20, 2005.

**EXHIBIT A**

**Final Office Action dated October 20, 2005**



## UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,329	05/09/2002	Volker Deichmann	112740-372	6261

29177 7590 10/20/2005  
BELL, BOYD & LLOYD, LLC  
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DATE MAILED: 10/20/2005

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/019,329	DEICHMANN ET AL.
	Examiner Tuan A. Tran	Art Unit 2682

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 05 July 2005.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 9-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 9-16 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:  
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date, \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holmstrom et al (WO 98/30053) in view of Iwata et al. (6,009,338).

Regarding claims 9 and 15, Holmstrom discloses a mobile phone (See fig. 1), comprising: a nonvolatile memory; an SIM card; at least one electronic telephone directory, one of the at least one of the electronic telephone directory being stored in a memory of the SIM card and another of the at least one of the electronic telephone directory, if applicable, being stored in the nonvolatile memory, a number of attributes including telephone numbers and names of the at least one telephone directory being prescribed by the SIM card (See fig.1, Table 1 and page 3 lines 5-8). However, Holmstrom does not mention that at least one database stored in the nonvolatile memory, each of the at least one database being respectively assigned to one of the at least one electronic telephone directory, wherein each entry of a telephone directory may be assigned to a corresponding database entry having a data field of variable size with respect to a number of additional attributes assigned to the telephone directory entry and wherein the at least one database is an expansion telephone directory. Iwata

teaches a mobile phone (See fig. 1) comprising an electronic telephone directory wherein each entry of a telephone directory may be assigned to a corresponding expansion telephone directory entry having a data field of variable size with respect to a number of additional attributes assigned to the telephone directory entry (See figs. 6-7 and col. 14 line 4 to col. 15 line 13). Since both Holmstrom & Iwata teach about the mobile phone having telephone directory, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Iwata in creating expansion telephone directories for the electronic telephone directory of the mobile phone as disclosed by Holmstrom for the advantage of allowing users to store additional information associated with the telephone directory.

Regarding claim 10, Holmstrom & Iwata disclose as cited in claim 9. Iwata further discloses each telephone directory is assigned precisely one database (See figs. 6-7).

Regarding claim 11, Holmstrom & Iwata disclose as cited in claim 9. Iwata further discloses each database has a key (in this case, the underlined name) associated with the respective assignment between the database and the associated telephone directory (See figs. 6-7 and col. 14 line 4 to col. 15 line 13).

Regarding claims 12-14, Holmstrom & Iwata disclose as cited in claim 9. Iwata further discloses each of the database entries includes a characteristic diagram which points to the corresponding telephone directory entry in the corresponding telephone directory, wherein the characteristic diagram of the database entry contains the corresponding telephone number and the data field of the database entry contains the

additional attributes of the telephone number of the corresponding telephone directory  
(See fig. 7 and col. 14 line 64 to col. 15 line 13).

Regarding claim 16, Holmstrom & Iwata disclose as cited in claim 15. Iwata further discloses the expansion telephone directory stored in the nonvolatile memory differs in format (in term of the amount of data being stored) from the electronic telephone directory stored in the SIM card (See fig. 7). However, they do not mention that the expansion telephone directory being assigned by an IMSI to the electronic telephone directory. IMSI is known as an identification (or the name) of the SIM card, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to assign the expansion telephone directory to the telephone directory entry represented by the IMSI for the advantage of allowing user to store additional information associate with the SIM card.

#### ***Response to Arguments***

Applicant's arguments filed 07/05/2005 have been fully considered but they are not persuasive.

a. In response to applicant's argument (See Remark, page 5-6) that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5

USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Holmstrom discloses a mobile phone comprising at least one electronic telephone directory wherein one of the at least one of the electronic telephone directory being stored in a memory of a SIM card and another of the at least one electronic telephone directory being stored in a nonvolatile memory of the mobile phone (See page 3, Table 1 and lines 5-9). However, Holmstrom does not mention that at least one database stored in the nonvolatile memory being assigned to one of the at least one electronic telephone directory as an expansion telephone directory. Iwata teaches a mobile phone (See fig. 1) comprising an electronic telephone directory wherein each entry of a telephone directory may be assigned to a corresponding expansion telephone directory (See figs. 6-7 and col. 14 line 4 to col. 15 line 13). Since both Holmstrom & Iwata teach about the mobile phone having telephone directory; therefore, it would have been obvious to one skilled in the art to create expansion telephone directory, as taught by Iwata, for the telephone directory of the mobile phone as disclosed by Holmstrom in order to allow users to store additional information associated with the telephone directory. The combination of Holmstrom & Iwata reads perfectly on the claimed subject matters of independent claim 9 and therefore the rejections are proper.

#### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Tuan Tran** whose telephone number is **(571) 272-7858**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Quochien Vuong**, can be reached at **(571) 272-7902**.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:**

**(571) 273-8300 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Application/Control Number: 10/019,329  
Art Unit: 2682

Page 7

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

WTW

Tuan Tran

AU 2682

*Quochien B. Vuong* 10/17/05

QUOCHIEN B. VUONG  
PRIMARY EXAMINER

**EXHIBIT B**

**Advisory Action dated February 23, 2006**



## UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,329	05/09/2002	Volker Deichmann	112740-372	6261
29177	7590	02/23/2006		
BELL, BOYD & LLOYD, LLC P. O. BOX 1135 CHICAGO, IL 60690-1135			EXAMINER	TRAN, TUAN A
			ART UNIT	PAPER NUMBER
			2682	

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

RECEIVED  
BELL, BOYD & LLOYD  
INTELLECTUAL PROPERTY DOCKET

FEB 27 2006  
PAK-PV2  
ATTY \_\_\_\_\_  
DOCKET # ~~112740-0372~~

**Advisory Action  
Before the Filing of an Appeal Brief**

<b>Application No.</b> 10/019,329  <b>Examiner</b> Tuan A. Tran	<b>Applicant(s)</b> DEICHMANN ET AL.	
---	---	--

*--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

THE REPLY FILED 23 January 2006 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1.  The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a)  The period for reply expires 3 months from the mailing date of the final rejection.
  - b)  The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
- Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(d).

**NOTICE OF APPEAL**

2.  The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

**AMENDMENTS**

3.  The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
  - (a)  They raise new issues that would require further consideration and/or search (see NOTE below);
  - (b)  They raise the issue of new matter (see NOTE below);
  - (c)  They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
  - (d)  They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_. (See 37 CFR 1.116 and 41.33(a)).

4.  The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5.  Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.
6.  Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

7.  For purposes of appeal, the proposed amendment(s): a)  will not be entered, or b)  will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) (or will be) as follows:

Claim(s) allowed: \_\_\_\_\_.

Claim(s) objected to: \_\_\_\_\_.

Claim(s) rejected: \_\_\_\_\_.

Claim(s) withdrawn from consideration: \_\_\_\_\_.

**AFFIDAVIT OR OTHER EVIDENCE**

8.  The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9.  The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).

10.  The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

**REQUEST FOR RECONSIDERATION/OTHER**

11.  The request for reconsideration has been considered but does NOT place the application in condition for allowance because:  
See Continuation Sheet.
12.  Note the attached Information Disclosure Statement(s). (PTO/SB/08 or PTO-1449) Paper No(s). \_\_\_\_\_.
13.  Other: \_\_\_\_\_.

Continuation of 11. does NOT place the application in condition for allowance because: In response to applicant's argument that there is no suggestion to combine the references (See Remark), the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the only difference between Holmstrom and the claimed subject matters is that Holmstrom does not mention database stored in the nonvolatile memory being assigned to one of the at least one electronic telephone directory. Iwata cures the deficiency of the Holmstrom reference by suggesting a mobile phone comprising an electronic telephone directory wherein each entry of the telephone directory being assigned to a corresponding expansion telephone directory entry (database). Therefore, Holmstrom in view of Iwata would perfectly arrive to the claimed subject matters. Further, the Applicant has failed to indicate clearly in the claims that database stored in the nonvolatile memory being assigned only to telephone directory stored in the Sim card. For that reasons, the rejections are proper and stand for all the pending claims.

TUAN TRAN  
DIV - 2618



DORIS H. TO  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER: 2600

EXHIBIT C

W0 98/30053 to Holmstrom et al. ("Holmstrom"), cited by the Examiner in the Office  
Action dated October 20, 2005

PCT

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International Bureau



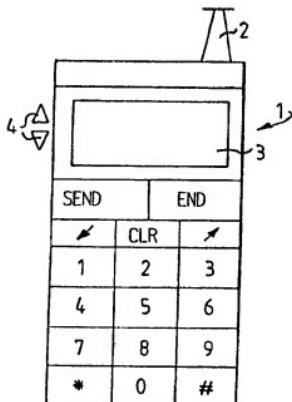
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : <b>H04Q 7/32, H04M 1/72</b>	A1	(11) International Publication Number: <b>WO 98/30053</b> (43) International Publication Date: <b>9 July 1998 (09.07.98)</b>
(21) International Application Number: <b>PCT/SE97/02134</b>		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPo patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).
(22) International Filing Date: <b>17 December 1997 (17.12.97)</b>		
(30) Priority Data: <b>9604805-3 27 December 1996 (27.12.96) SE</b>		
(71) Applicant: <b>TELEFONAKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126 25 Stockholm (SE)</b>		
(72) Inventors: <b>HOLMSTRÖM, J., Tomas; Johan Åkermans Väg 3, S-240 10 Dalby (SE). ISBERG, B., Johanna; Viborgsgatan 42, S-224 72 Lund (SE). DAHLKVIST, H., F., Mikael; Näktergålsvägen 5, S-247 37 S. Sandby (SE).</b>		
(74) Agents: <b>HERBJØRNSEN, Rut et al.; H. Albinhs Patentbyrå AB, P.O. Box 3137, S-103 62 Stockholm (SE).</b>		

(54) Title: A USER INTERFACE FOR A MOBILE COMMUNICATION UNIT

(57) Abstract

In a mobile communication unit (1), the phone book is adapted, in a first step, to enable selection of more than one item stored in the phone book and thereafter, in a second step, enable selection of an operation in the phone book to be executed on all items selected in the first step.



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**A USER INTERFACE FOR A MOBILE COMMUNICATION UNIT****TECHNICAL FIELD**

The invention relates to a mobile communication unit and more particularly to the  
5 phone book of a mobile communication unit.

**BACKGROUND OF THE INVENTION**

In phone books in mobile communication units, e.g. mobile phones, a number of  
predetermined operations are stored. These operations can be selected for execution  
10 on items, e.g. names and numbers for abbreviated dialling, that a user of the mobile  
phone has stored in the phone book. By selecting the phone book on the menu of the  
mobile phone, the operations stored in the phone book will be displayed on the  
display of the mobile phone together with the items stored in the phone book. To  
store items in the phone book, the keypad of the mobile phone is used in a manner  
15 known per se. The keypad is also used for selecting items displayed on the display as  
well as operations displayed on the display to be executed on the selected items.

Today, the use of the phone book is limited. This is i.a. due to the fact that for  
complex operations, such as conference calls, the user must have a detailed  
20 knowledge about the operations as such in order to be able to use them.

**BRIEF DESCRIPTION OF THE INVENTION**

The object of the invention is to enhance the use of the phone book in mobile phones  
by simplifying the steps that a user have to go through in order to utilize complex  
25 operations, e.g. establish a conference call.

This is attained in the mobile communication unit according to the invention in that  
it is possible to select more than one item in the phone book and thereafter select an  
operation to be executed on all selected items.

Hereby, it will not be necessary for a user to have a detailed knowledge about any complex operation, such as establishing a conference call, in order to utilize that operation.

## 5 BRIEF DESCRIPTION OF THE DRAWING

The invention will be described more in detail below with reference to the appended drawing, on which Fig.1 shows a standard mobile phone in which the present invention has been implemented, and Fig.2 is a flowchart illustrating the setting up of a conference call using the mobile phone in Fig.1.

10

## PREFERRED EMBODIMENTS

Fig.1 shows an embodiment of a mobile phone generally denoted 1. In a manner known per se, the mobile phone 1 comprises an antenna 2, a display 3, and a keypad having a number of keys including i.a. normal alphanumeric keys, a SEND key, an

15 END key, two ARROW keys, and, in the embodiment shown, on one side of the phone, two volume keys 4, which also are used as SELECT keys.

20 The mobile phone 1 comprises a phone book (not shown) which stores predetermined, programmed operations to be executed on items to be stored in the phone book.

In accordance with the invention, i.a. the following operations are programmed in the phone book: store, copy, erase, call, and conference call.

25 In order to describe the function of the phone book according to the invention, it is assumed that a number of items, i.e. names and numbers for abbreviated dialling, have been stored in a manner known per se in the phone book. Thus, it is assumed that the contents of the phone book is as indicated in the below Table 1:

TABLE 1

Phone Book	
Adam...	7
Bertil...	19
Cesar	¤44
.	
Zeke	¤2
Store	
Copy	
Erase	
Call	
Conference Call	

- 5 The items indicated in the phone book according to Table 1 are names and corresponding numbers for abbreviated dialing. The abbreviated numbers preceded by a "¤" are stored in an EEPROM of the phone, while the abbreviated numbers not preceded by a "¤" are stored in a SIM card of the phone in a manner known per se.
- 10 In accordance with the invention, more than one item displayed on the display 3 can be selected by moving the cursor (not shown) to the respective item by means of the ARROW keys and, then, pressing the SELECT keys 4. It is supposed that "Adam", "Bertil", and "Zeke" have been selected. The phone book would then be displayed on the display 3 as shown in the below Table 2.

15

TABLE 2

Phone Book	
Adam...	7
Bertil...	19
Cesar	¤44
.	
Zeke	¤2
Store	
Copy	
Erase	
Call	
Conference Call	

Now, any of the operations "Copy", "Erase", "Call" or "Conference Call" can be selected from the bottom of Table 2 for execution on the selected items in Table 2, i.e. "Adam", "Bertil", and "Zeke".

- 5 If "Copy" is to be selected, the cursor (not shown) is moved to "Copy" by means of the ARROW keys, whereupon the SEND key is pressed. Hereby, selected items in Table 2 having an abbreviated number not preceded by a "□" are copied from the SIM card to the first free positions in the EEPROM, while items having an abbreviated number preceded by a "□", are copied from the EEPROM to the first  
10 free positions in the SIM card.

If "Erase" is selected by moving the cursor to "Erase" by means of the ARROW keys and pressing the SEND key, the selected items in Table 2 are erased from the SIM card and the EEPROM, respectively, in the mobile phone.

- 15 If "Call" is selected by moving the cursor to "Call" by means of the ARROW keys and pressing the SEND key, the selected items in Table 2 can be called one by one. However, the user is prompted to confirm every call. By again pressing the SEND key, "Adam" is called. If the user instead presses the END key, "Adam" is not called.  
20 Instead, the user will be prompted to confirm whether or not "Bertil" is to be called. By pressing the SEND key, "Bertil" is called. By pressing the END key, "Bertil" is not called. Instead, the user will be prompted to confirm whether or not "Zeke" is to be called. If the SEND key is pressed, "Zeke" is called. If the END key is pressed, "Zeke" is not called.

- 25 If "Conference Call" is selected by moving the cursor to "Conference Call" by means of the ARROW keys and pressing the SEND key, the selected items in Table 2 can be joined into a conference call. As in the above "Call" case, the selected items will be called one by one and put on hold. The user initiating the conference  
30 call must then join the called parties to the conference call, one by one, as will be described below with reference to Fig. 2.

It is assumed that a conference call is to be established from the user to "Adam", "Bertil", and "Zeke" selected in the phone book in accordance with Table 2, as well as to a party "Bo". "Bo" is not stored in the phone book but is supposed to have  
5 phone number 04312579.

As mentioned above, by moving the cursor to "Conference Call" by means of the ARROW keys and pressing the SEND key, the selected items in Table 2 can be joined into a conference call.  
10

Fig. 2 shows what is displayed on the display 3 of the mobile phone 1 in the steps needed to establish the conference call.

In step I in the left hand column in Fig. 2, the user is prompted on the display 3 to  
15 confirm whether or not a call should be established to "Adam" having the indicated telephone number and the indicated abbreviated number.

By pressing the SEND key on the keypad of the mobile phone 1, a call will be established to "Adam". Instead, if the END key is pressed, "Adam" will not be  
20 called but the user will be prompted to confirm whether or not a call should be established to the next selected item, i.e. "Bertil".

It is assumed in Fig. 2 that a call should be established to "Adam". Thus, the user presses the SEND key and a call is established to "Adam". The display 3 will show  
25 what is illustrated in step II in Fig. 2. As is illustrated in step II, the user is prompted to confirm whether or not to add "Adam" to the conference. By pressing the END key, "Adam" is disconnected. In Fig. 2, it is assumed that the user instead presses the SEND key, whereupon a connection is established to "Adam". Then, the user is prompted to confirm whether or not a call should be established to the next selected  
30 item, i.e. "Bertil" as illustrated in step III in Fig. 2. It is assumed that the user presses the SEND key, whereupon a call is established to "Bertil" having the indicated

telephone number and the indicated abbreviated number. When the SEND key is pressed, "Adam" is put on hold. In step IV, the user is prompted to confirm whether or not to add "Bertil" to the conference. If the END key is pressed, "Bertil" is disconnected. In Fig. 2, it is assumed that the SEND key is pressed, whereupon 5 "Bertil" is added to the conference. In step V, the user is prompted to confirm whether or not a call should be established to the next selected item, i.e. "Zeke".

Moving to the right hand column of Fig. 2, it is assumed that a call is established to "Zeke" in that the user presses the SEND key. By pressing the SEND key, the 10 conference is put on hold. In step VI, the user is prompted to confirm whether or not to add "Zeke" to the conference. If the END key is pressed, "Zeke" is disconnected. In Fig. 2, it is assumed that the SEND key is pressed, whereupon "Zeke" is added to the conference.

15 Now, all the selected items in Table 2 have been added to the conference by being put on hold. In accordance with the invention, the user is then prompted by the phone book to confirm whether or not more parties should be added to the conference, i.e. parties not stored in the phone book. This is illustrated in step VII in Fig. 2.

20 By pressing the SEND key, the user indicates to the phone book that another party should be added to the conference. In step VIII in Fig. 2, it is assumed that the user manually dials the indicated phone number, i.e. the number of the party "Bo", and presses the SEND key to establish a call to "Bo". By pressing the SEND key, the 25 conference is put on hold.

In step IX, the user is prompted to confirm whether to add "Bo" to the conference. If the END key is pressed, "Bo" is disconnected. In Fig. 2, it is assumed that the SEND key is pressed, whereupon "Bo" is added to the conference.

30 In step X, step VII is repeated, namely the user is prompted to confirm whether or

not more parties should be added to the conference call.

In Fig. 2, it is assumed that no further parties shold be added to the conference.  
Thus, by pressing the END key, the user joins the conference put on hold and the  
5 conference is made active.

The use of the phone book as a menu of items on which operations can be performed, makes the mobile phone according to the invention easy to use in that the user interface is easy to understand.

**CLAIM**

- A mobile communication unit (1) comprising
- a phone book storing predetermined operations to be executed on items to be stored
  - 5 in the phone book,
  - a display (3) for displaying the operations stored in the phone book, and any item stored in the phone book, and
  - a keypad for keying items to be stored in the phone book, and for selecting, on one hand, items on the display and, on the other hand, operations on the display to be
  - 10 executed on the selected items, characterized in that the phone book is adapted to enable, in a first step, selection of more than one item displayed on the display and, in a second step, selection of an operation to be executed on all the items selected in the first step.

1/2

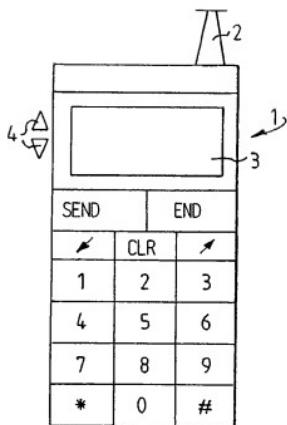


FIG.1

2 / 2

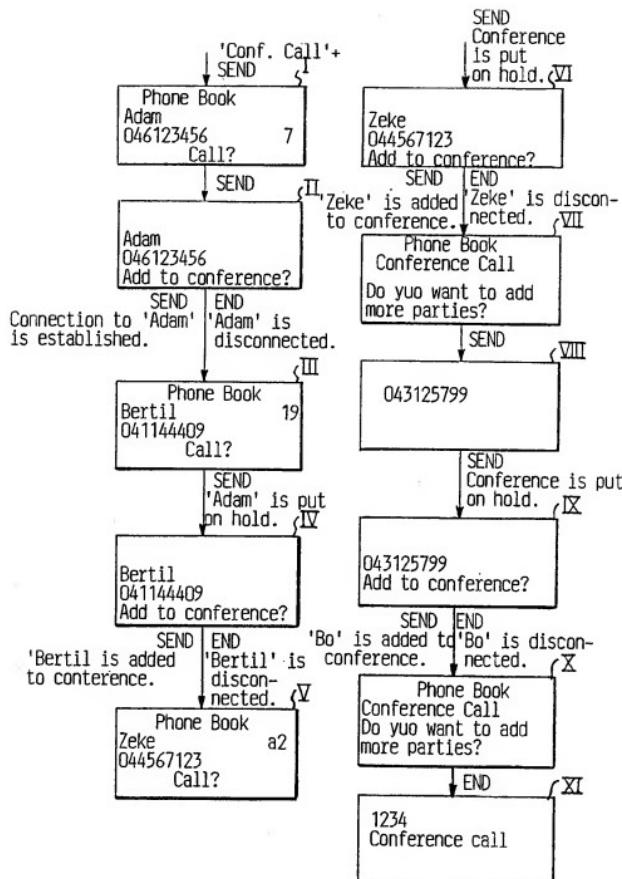


FIG. 2

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/02134

## A. CLASSIFICATION OF SUBJECT MATTER

**IPC6: H04Q 7/32, H04M 1/72**

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

**IPC6: H04Q, G06F, H04M**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

**SE,DK,FI,NO classes as above**

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0721272 A2 (NOKIA MOBILE PHONES LTD.), 10 July 1996 (10.07.96), see whole document --	1
Y	EP 0624965 A2 (US WEST ADVANCED TECHNOLOGIES, INC.), 17 November 1994 (17.11.94), see whole document --	1
Y	EP 0704788 A2 (AT&T CORP.), 3 April 1996 (03.04.96), column 2, line 6 - line 19; column 4, line 35 - column 5, line 16 --	1
Y	US 5408659 A (CATHERINE J. CAVENDISH ET AL), 18 April 1995 (18.04.95), see whole document --	1

Further documents are listed in the continuation of Box C.  See patent family annex.

\* Special categories of cited documents

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search

Date of mailing of the international search report

5 May 1998

08-05-1998

11-05-1998

Name and mailing address of the ISA/

Authorized officer

Swedish Patent Office

Peter Hedman

Box 5055, S-102 42 STOCKHOLM

Facsimile No. + 46 8 666 02 23/05,

EAST Version: 2.0.1.47822500

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/02134

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2291560 A (MOTOROLA INC.), 24 January 1996 (24.01.96), see whole document --	1
A	US 5526411 A (MARCUS A. KRIETER), 11 June 1996 (11.06.96), see whole document --	1
A	EP 0534478 A2 (CASIO COMPUTER CO., LTD.), 31 March 1993 (31.03.93), column 1, line 53 - column 2, line 13; column 6, line 45 - column 8, line 24 -----	1

## INTERNATIONAL SEARCH REPORT

Information on patent family members

02/04/98

International application No.

PCT/SE 97/02134

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0721272 A2	10/07/96	FI 1852 U FI 97507 B,C FI 950079 A,V US 5710810 A	13/04/95 13/09/96 06/07/96 20/01/98
EP 0624965 A2	17/11/94	US 5457738 A	10/10/95
EP 0704788 A2	03/04/96	CA 2156208 A JP 8129530 A US 5625673 A	23/03/96 21/05/96 29/04/97
US 5408659 A	18/04/95	NONE	
GB 2291560 A	24/01/96	CA 2152861 A CN 1133521 A DE 19523998 A FI 953215 A FR 2722632 A GB 9514125 D IT 1278514 B IT RM950487 A JP 8065178 A SE 9502614 A SG 32407 A US 5584054 A	19/01/96 16/10/96 01/02/96 19/01/96 19/01/96 00/00/00 24/11/97 18/01/96 08/03/96 19/01/96 13/08/96 10/12/96
US 5526411 A	11/06/96	NONE	
EP 0534478 A2	31/03/93	DE 69216971 D,T JP 5211464 A KR 9608830 B US 5337346 A	15/05/97 20/08/93 05/07/96 09/08/94

EXHIBIT D

U.S. Patent No. 6,009,338 to Iwata ("*Iwata*") cited by the Examiner in the Office Action  
dated October 20, 2005

# United States Patent [19]

Iwata et al.



US006009338A

[11] Patent Number: 6,009,338

[45] Date of Patent: Dec. 28, 1999

[54] MOBILE INFORMATION TERMINAL EQUIPMENT AND PORTABLE ELECTRONIC APPARATUS

[75] Inventors: Yuji Iwata; Hideki Sato; Hiroshi Saito; Kazumi Matsuura; Kazuhisa Shinoda; Minoru Owada; Yasuyuki Mochizuki; Michio Orita, all of Tokyo, Japan

[73] Assignee: Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

[21] Appl. No.: 08/837,452

[22] Filed: Apr. 17, 1997

[30] Foreign Application Priority Data

Apr. 26, 1996 [JP] Japan ..... 8-106999  
May 23, 1996 [JP] Japan ..... 8-128538  
Nov. 15, 1996 [JP] Japan ..... 8-304872

[51] Int. Cl.<sup>6</sup> ..... H04B 1/38

[52] U.S. Cl. ..... 455/575; 455/90; 379/428

[58] Field of Search ..... 455/90, 566, 158.2,

455/550, 575; 379/433, 428

[56] References Cited

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6-284067 10/1994 Japan .

Primary Examiner—Reinhard J. Eisenzopf

Assistant Examiner—Greta Fuller

## [57] ABSTRACT

The objective of the present invention is to have a desired screen displayed with shortened waiting time in using functions for the electronic note, etc., while engaging in telephone talk. Another prime objective of the present invention is to achieve an easy-to-use mobile information terminal equipment which also functions as an electronic note, word processor, personal computer, and so on. In transitioning from telephone mode (cover closed status) to information terminal mode (cover opened status), the screen to be displayed is determined to be either a historical information, talk log information, or user setting screen. This enables the user to obtain the desired screen with fewer number of operations and with less waiting time.

16 Claims, 53 Drawing Sheets

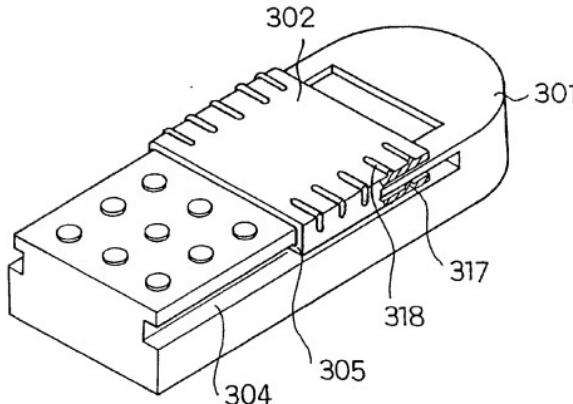


Fig. 1

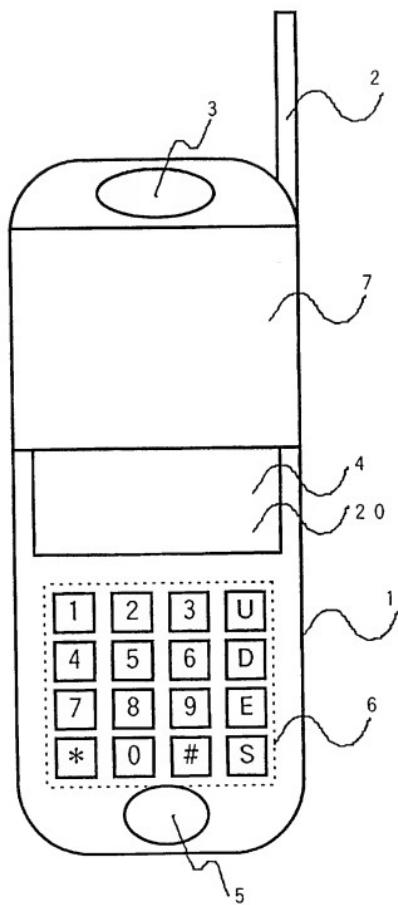


Fig.2

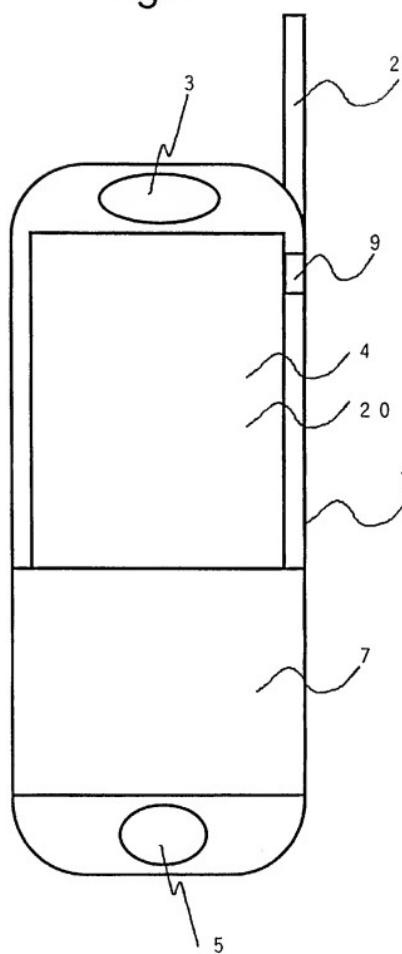


Fig.3

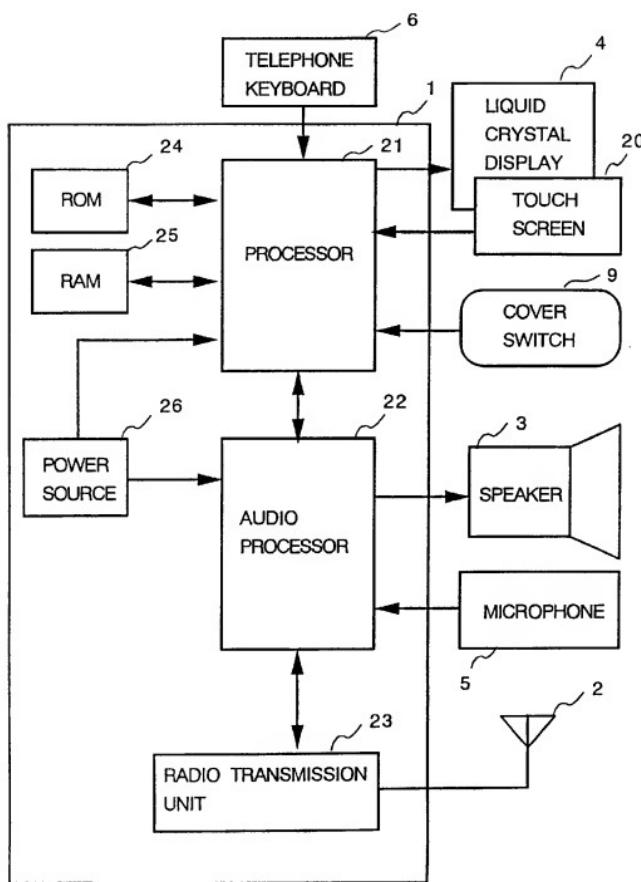


Fig.4

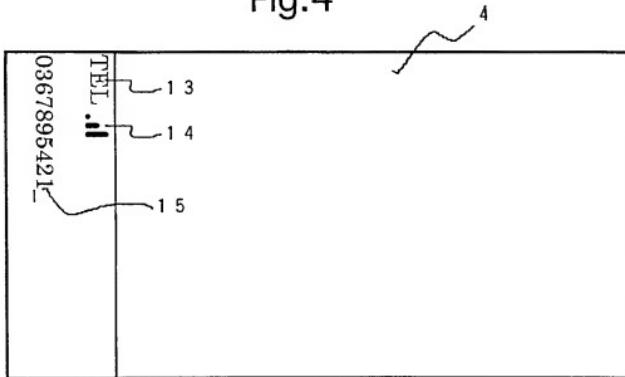


Fig.5

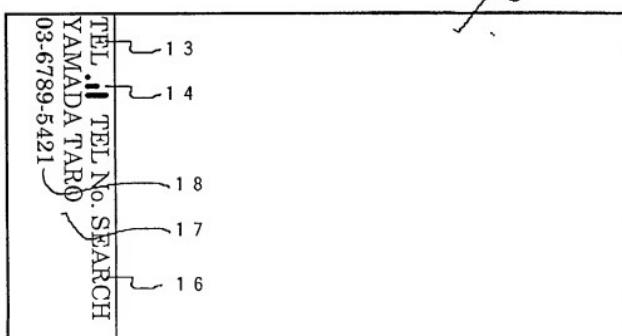


Fig. 6

27

A	△ YA
KA	RA
SA	WA
TA	□ A
NA	B
HA	C
MA	D
△	▽
DETAILS	<input type="checkbox"/> TALK LOG
	<input type="checkbox"/> MEMO
	<input type="checkbox"/> SCHEDULE
	<input checked="" type="checkbox"/> ADDRESS
	<input type="checkbox"/> TELEPHONE
	<input type="checkbox"/> BOOK

Fig.7

27

4

A	NAME: 松浦 次郎(MATSUURA JIRO)
KA	HOME ADDRESS: 〒247, KAMAKURA MANSION 100
SA	KAMAKURA1-1-1 KAMAKURA-CITY
TA	HOME PHONE: (0467)11-2222
NA	COMPANY NAME: TOKYO DENKI CO.LTD.
HA	DEPT. POSITION: DEVELOPMENT DEPT.
MA	DEVELOPMENT SECTION MANAGER
OFFICE ADDRESS: 〒100, TOKYO 9-9-9 TOKYO-WARD TOKYO	
OFFICE PHONE: (03)3333-4444	
OFFICE FAX: (03)7777-6666	
△	<input type="checkbox"/> NAME <input type="checkbox"/> TALK LOG <input type="checkbox"/> MEMO <input type="checkbox"/> SCHEDULE <input checked="" type="checkbox"/> ADDRESS <input type="checkbox"/> TELEPHONE
△	<input type="checkbox"/> LIST <input checked="" type="checkbox"/> BOOK

29

A B C D

28

30

Fig.8

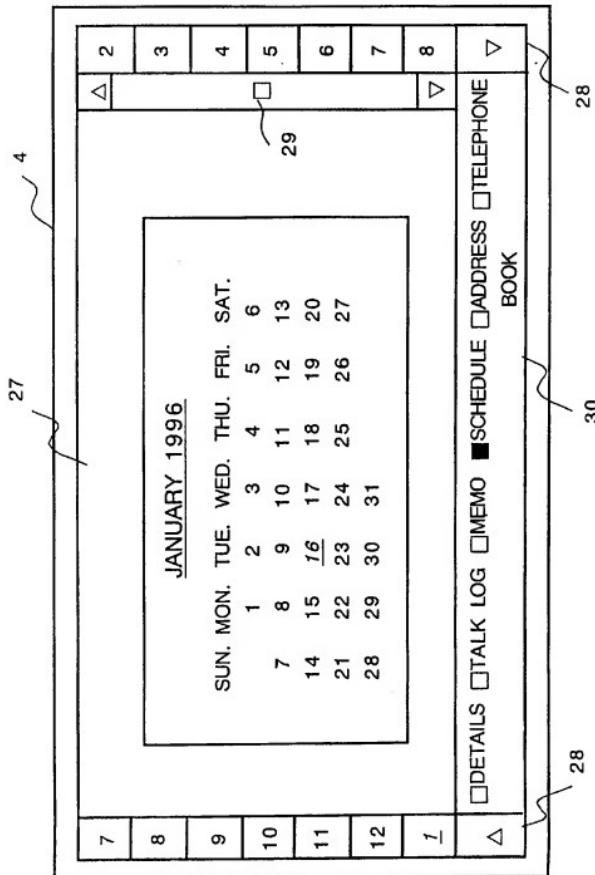


Fig. 9

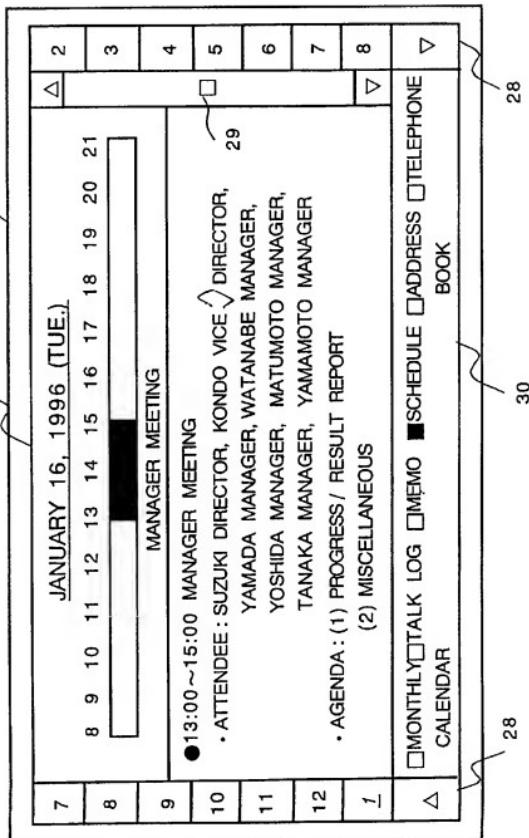


Fig. 10

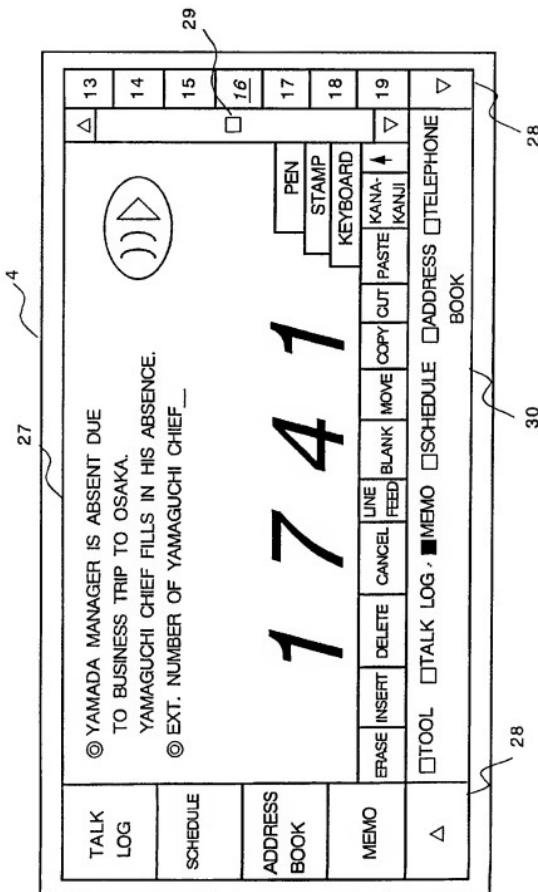


Fig. 11

10	<input type="checkbox"/> 1995.2.16 9:12 (0467)12-3456	WATANABE CONSTRUCTION	[ME.]	[ADD.]	<input checked="" type="triangle"/>	ADDRESS BOOK
	<input checked="" type="square"/> 1995.2.16 10:34 (03)643-1234	YAMADA FLORIST				
11	<input checked="" type="circle"/> 1995.2.16 12:56 (0467)99-3456	SHIMIZU ELECTRIC	[ME.]	[SCH.]		
	<input type="circle"/> 1995.2.16 15:21 (0467)12-3456	KIMURA WATCH	[ME.]	[SCH./ADD.]		
12	<input checked="" type="triangle"/> 1995.2.16 17:43 LD12345.meico	WATANABE ICHIRO				
	<input type="triangle"/> 1995.2.16 20:05 SD12345.meico	WATANABE HANAKO	[ADD.]			
13						
14						
25						
16						
					<input type="triangle"/>	DETAILS    ■ TALK LOG    □ MEMO    □ SCHEDULE    □ TELEPHONE BOOK
					<input type="square"/>	
					<input type="circle"/>	
					<input type="line-dot"/>	

Fig. 12

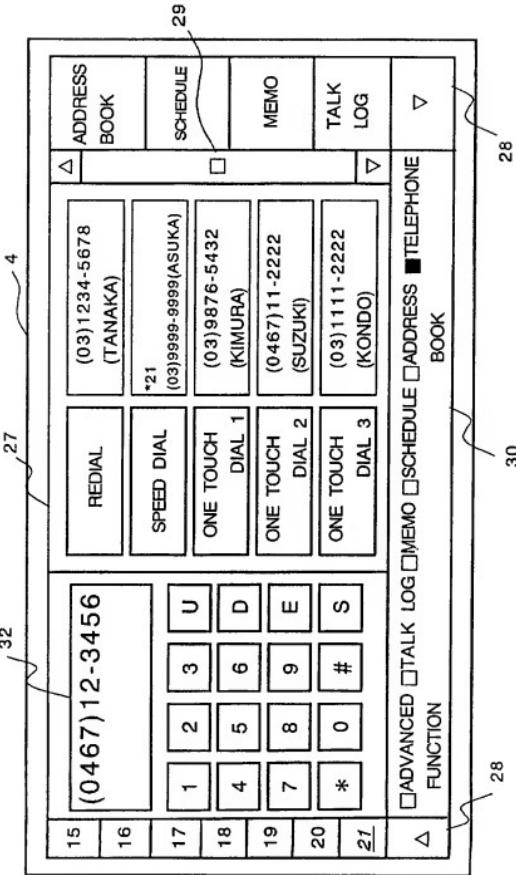


Fig.13

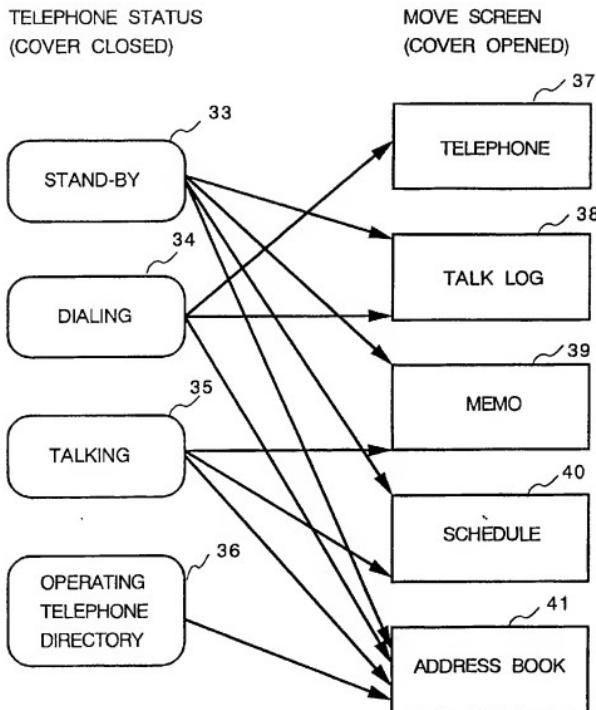


Fig. 14

TELEPHONE STATUS (COVER CLOSED)	MOVE CONDITION	MOVE SCREEN (COVER OPENED)
STAND BY 33	USER SETTING	USER SET SCREEN
STAND BY 33	HISTORY SETTING	HISTORY SET SCREEN
STAND BY 33	NO SETTING	ADDRESS BOOK 41 SCREEN
DIALING 34	USER SETTING	USER SET SCREEN
DIALING 34	NO USER SETTING	TELEPHONE 37 SCREEN
TALKING 35	USER SETTING	USER SET SCREEN
TALKING 35	CORRESPONDING TALK LOG 38	TALK LOG 38 SET SCREEN
TALKING 35	HISTORY SETTING	HISTORY SET SCREEN
TALKING 35	NO SETTING	MEMO 39 SCREEN
OPERATING TELEPHONE DIRECTORY 36	USER SETTING	USER SET SCREEN
OPERATING TELEPHONE DIRECTORY 36	NO USER SETTING	ADDRESS BOOK 41 SCREEN

Fig. 15

47 TELEPHONE STATUS (COVER CLOSED)	MOVE SCREEN (COVER OPENED)
STAND BY 33	—
DIALING 34	TALK LOFG 38
TALKING 35	—
OPERATING TELEPHONE DIRECTORY 36	TALK LOFG 38

46

Fig. 16

HISTORY NO.	TELEPHONE STATUS (COVER CLOSED)	TRANSITION DIRECTION	SCREEN (COVER OPENED)
9	STAND BY 33	→	—
8	STAND BY 33	↓	SCHEDULE 40
7	OPERATING TELEPHONE DIRECTORY 36	↑	TALK LOG 38
6	STAND BY 33	↓	ADDRESS BOOK 41
5	STAND BY 33	↑	SCHEDULE 40
4	DIALING 34	↓	TELEPHONE 37
3	STAND BY 33	↑	MEMO 39
2	TALKING 35	↓	TALK LOG 38
1	STAND BY 33	↑	MEMO 39

50      51      52      53      49

Fig. 17

TYPE	TALK TIME & DATE	PHONE NO.	OPPOSITE PARTY	ADDRESS	TYPE	ADDRESS	TYPE	ADDRESS	TYPE	ADDRESS	
□	1995.2.16/9:12	(0487)12-3456	WATANABE CONSTRUCTION CO. LTD.	30100 [ME.]	10010 [ADD.]	—	—	—	—	—	—
■	1995.2.16/10:34	(03)6543-1234	YAMADA FLORIST	—	—	—	—	—	—	—	—
●	1995.2.16/12:56	(0487)99-3456	SHIMIZU ELECTRIC	30200 [ME.]	20200 [SCH.]	—	—	—	—	—	—
○	1995.2.16/15:21	(0487)12-3456	KIMURA WATCH	10200 [ADD.]	20440 [SCH.]	30300 [M.E.]	—	—	—	—	—
▲	1996.2.16/17:43	LD12345. meico	WATANABE ICHIRO	—	—	—	—	—	—	—	—
△	1996.2.16/20:05	SD12345. meico	WATANABE HANAKO	10230 [ADD.]	—	—	—	—	—	—	—

Fig.18

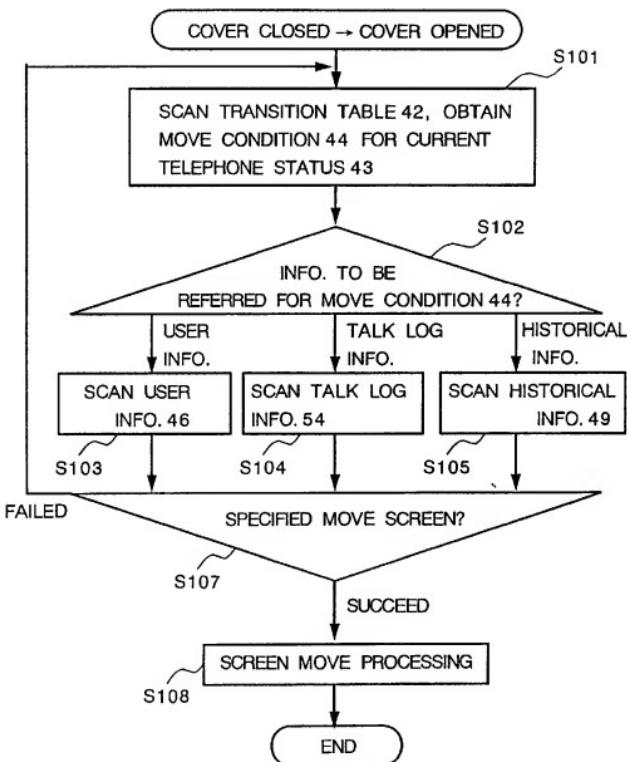


Fig.19

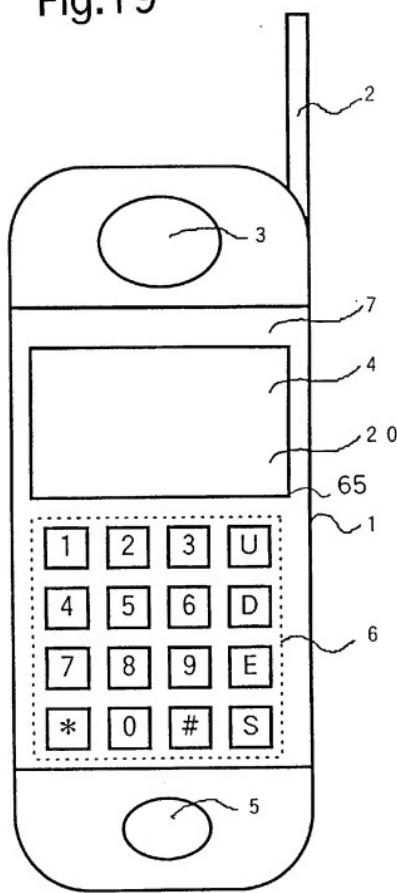


Fig.20

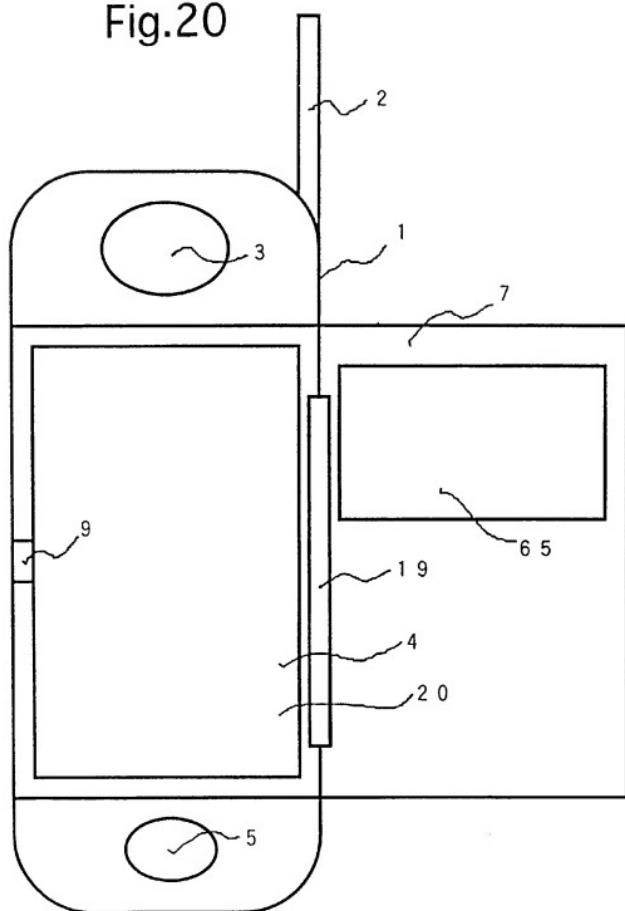


Fig.21

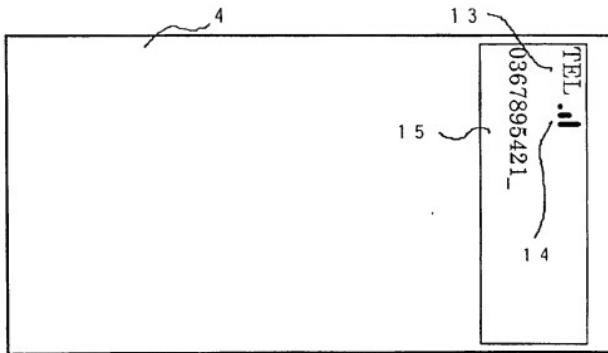


Fig.22

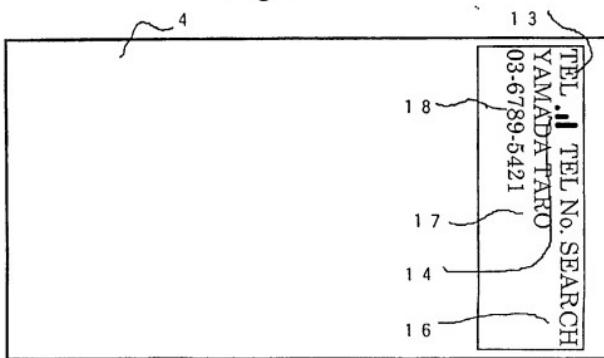


Fig.23

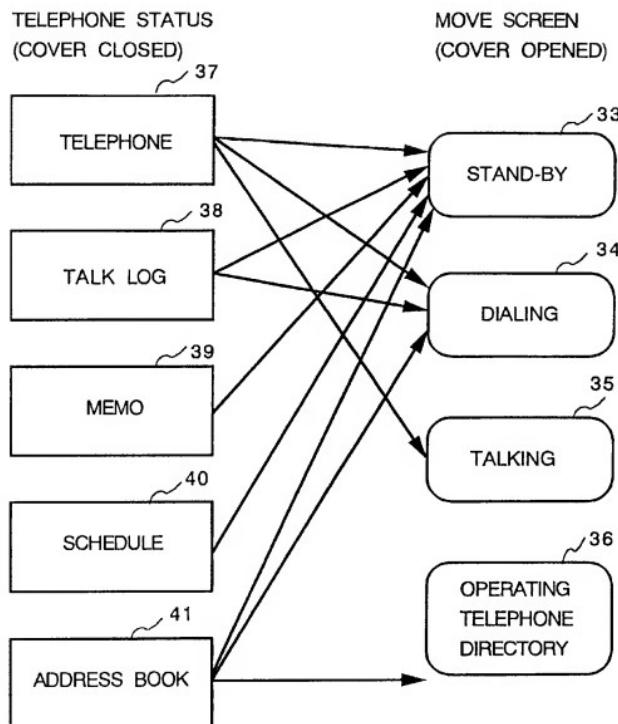


Fig.24

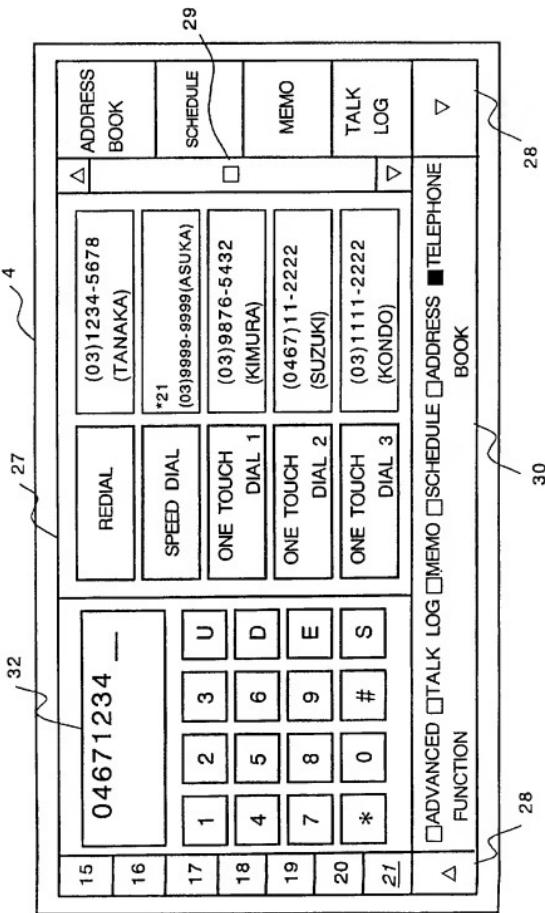


Fig.25

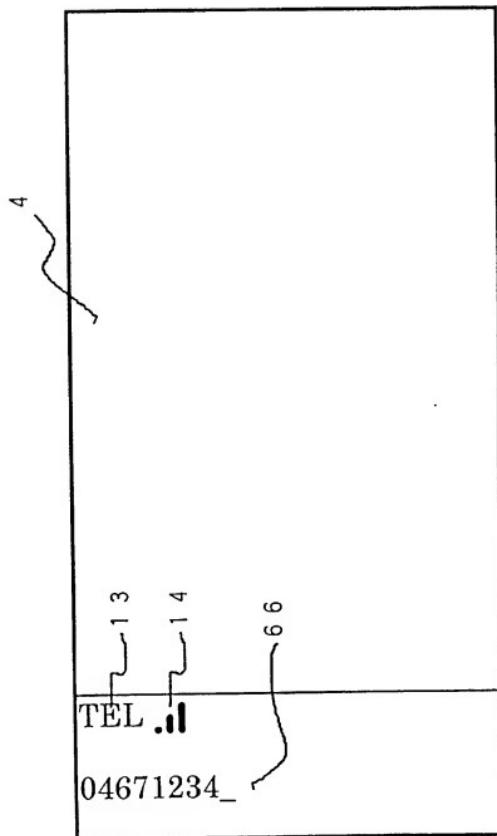


Fig.26

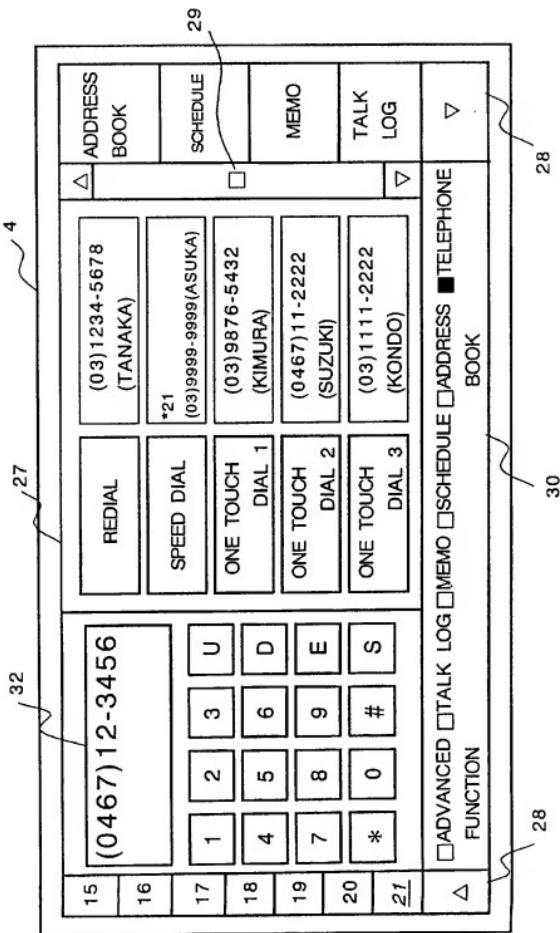


Fig.27

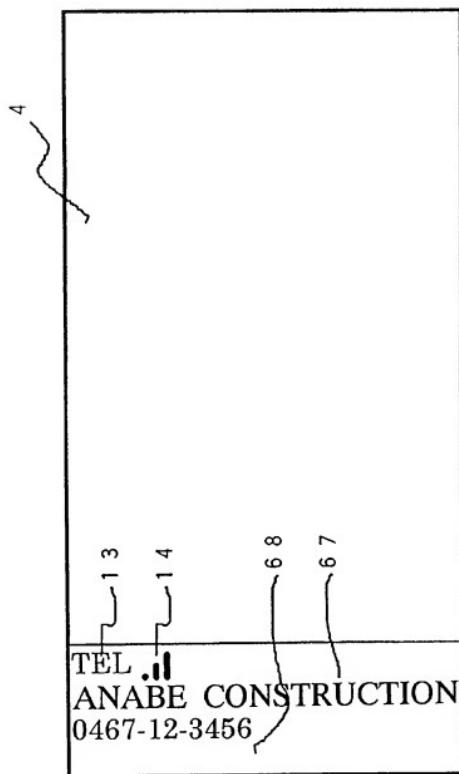


Fig.28

A	NAME: 松浦 次郎(MATSUURA JIRO)
KA	HOME ADDRESS: <u>〒247, KAMAKURA MANSION 100</u>
SA	<u>KAMAKURA1-1-1 KAMAKURA-CITY</u>
TA	<u>HOME PHONE: (0467)11-2222</u>
NA	COMPANY NAME: TOKYO DENKI CO.LTD.
HA	DEPT. POSITION: DEVELOPMENT DEPT.
MA	DEVELOPMENT SECTION MANAGER
△	OFFICE ADDRESS: <u>〒100, TOKYO 9-9-9 TOKYO-WARD TOKYO</u>
▽	<u>OFFICE PHONE: (03)3333-4444</u>
	<u>OFFICE FAX: (03)7777-6666</u>
<input type="checkbox"/> NAME <input type="checkbox"/> TALK LOG <input type="checkbox"/> MEMO <input type="checkbox"/> SCHEDULE <input checked="" type="checkbox"/> ADDRESS <input type="checkbox"/> TELEPHONE <input type="checkbox"/> LIST BOOK	
27	28
29	30
4	28
A	D
B	C
△	▽

Fig.29

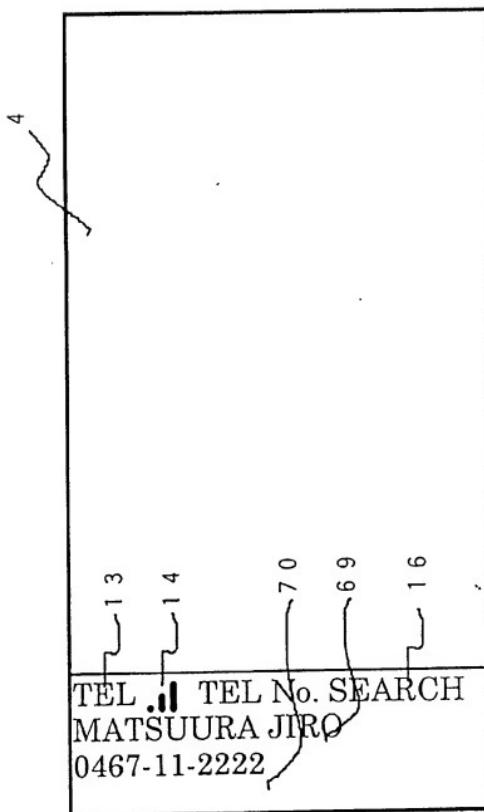


Fig.30

NAME[0]	HOME ADDRESS	HOME PHONE[*]	HOME FAX	COMPANY NAME
DEPT. POSITION	OFFICE ADDRESS	OFFICE PHONE	OFFICE FAX	FORE AND BACK POINTERS
76	77	78	79	80
松井 一郎 (MATSUI ICHIRO)				
松浦 次郎 (MATSUURA JIRO)	〒247, KAMAKURA MANSION 100 KAMAKURA-1-1 KAMAKURA-CITY	(0467)11- 2222	(0467)99- 8888	TOKYO ELECTRIC CO.LTD.
MANAGER DEVELOPMENT DEPT. DEVELOPMENT SECTION	〒100, TOKYO 9-9-9 TOKYO-WARD TOKYO	(03)3333- 4444	(03)7777- 6666	10600 11200
松江 三郎 (MATSUE SABURO)				
松岡 四郎 (MATSUOKA SHIRO)				
松川 五郎 (MATSIKAWA GORO)				
松島 六郎 (MATSUMIMA ROKURO)				
松村 七郎 (MATSUMURA SHICHIRO)				
松本 八郎 (MATSUMOTO HACHIRO)				
松山 九郎 (MATUYAMA KURO)				

Fig.31

A	JAPAN RAILWAY COMPANY		
	SEAT RESERVATION		
KA	<input type="checkbox"/> MONTH	<input checked="" type="checkbox"/> 15 DATE	TRAIN NAME
SA	FROM	TOKYO	<u>MIRAI</u>
TA	TRAIN TYPE	SUPER EXPRESS	SEAT TYPE
NA	ADULT	<input type="checkbox"/> 2 PIECE	<input type="checkbox"/> CHILD
HA	PIECE	2	PIECE
MA			TRANSMISSION
<input type="checkbox"/> DETAILS <input type="checkbox"/> TALK LOG <input type="checkbox"/> MEMO <input type="checkbox"/> SCHEDULE <input type="checkbox"/> ADDRESS <input type="checkbox"/> TELEPHONE BOOK			
△ YA RA WA A B C D			

29

81

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82

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Fig.32

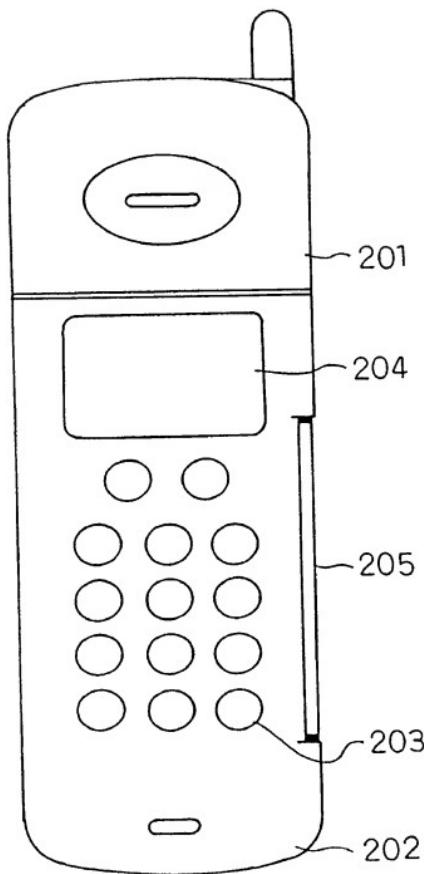


Fig.33

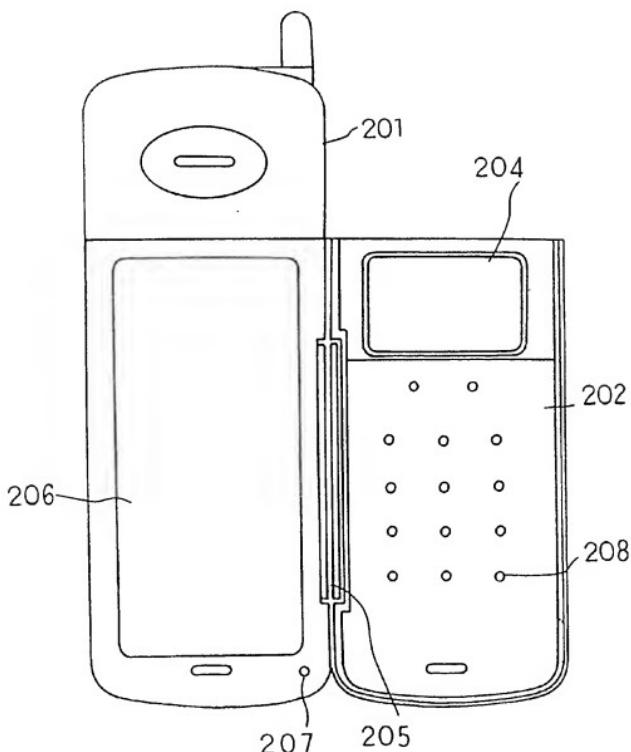


Fig.34

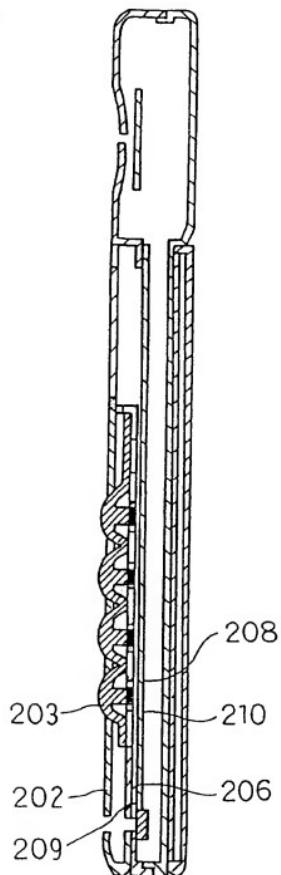


Fig.35

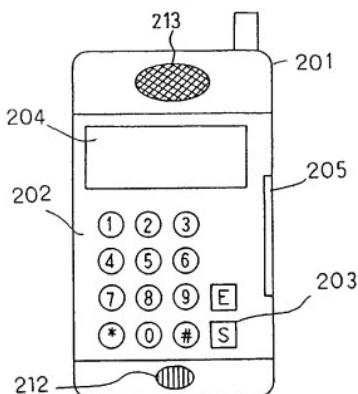


Fig.36

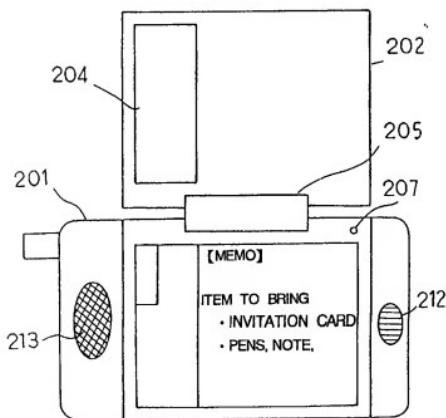


Fig.37

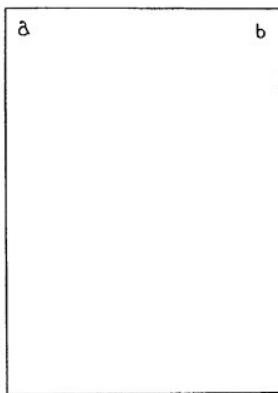


Fig.38

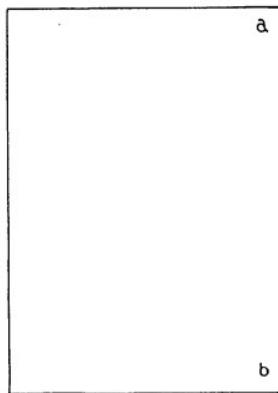


Fig.39

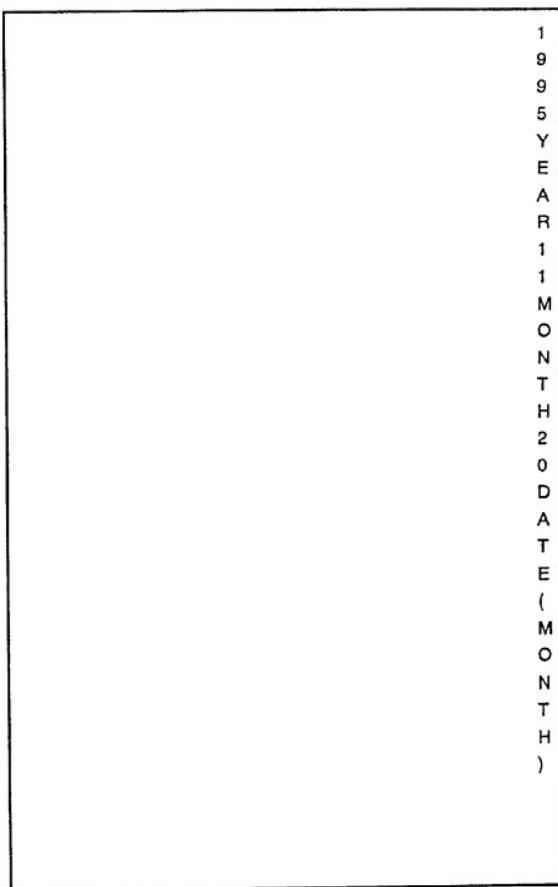


Fig.40

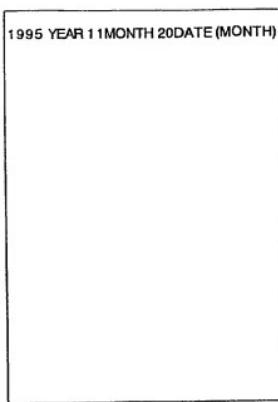


Fig.41



Fig.42

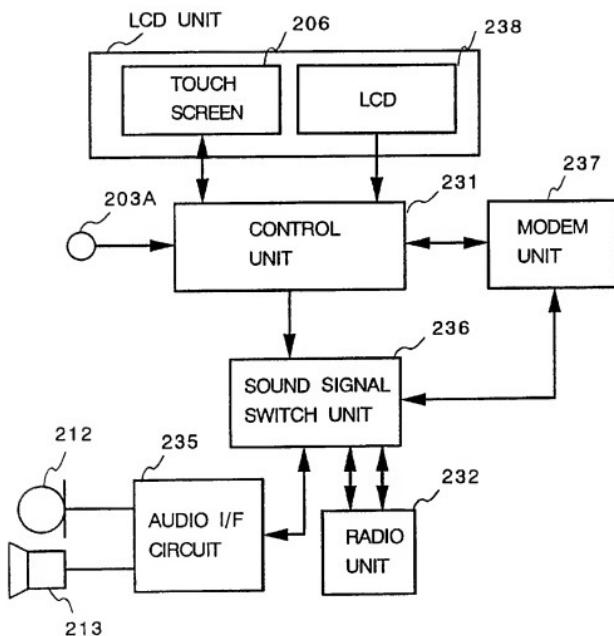


Fig.43

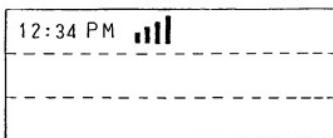


Fig.44

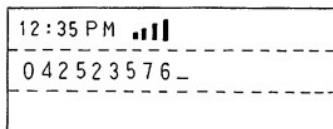
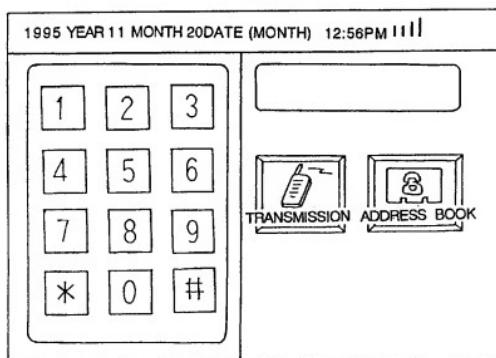


Fig.45



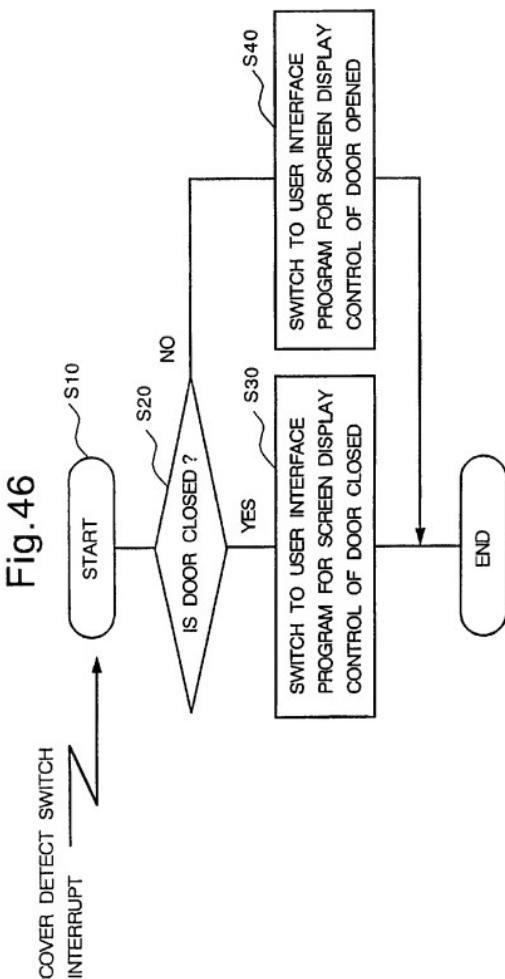


Fig.47

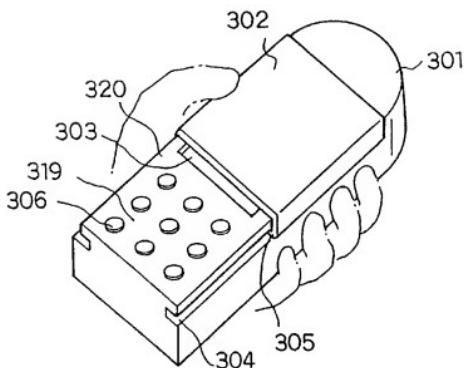


Fig.48

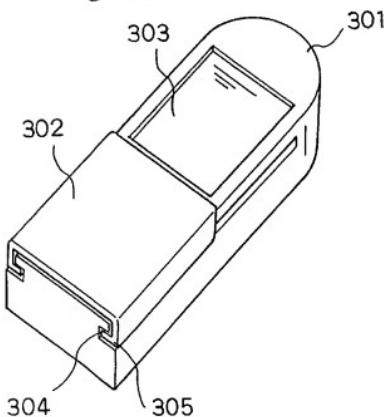


Fig.49A

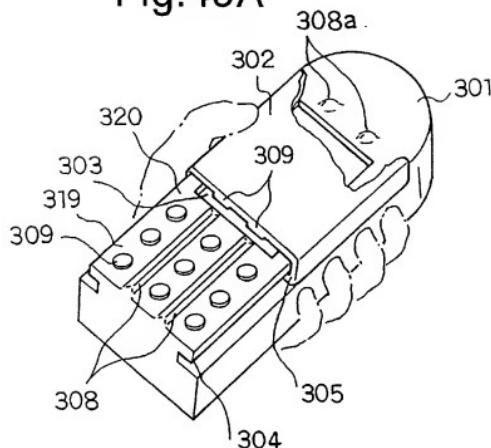


Fig.49B

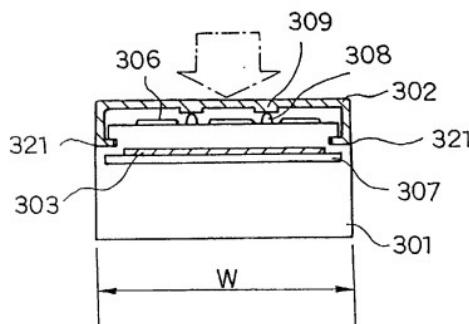


Fig.50

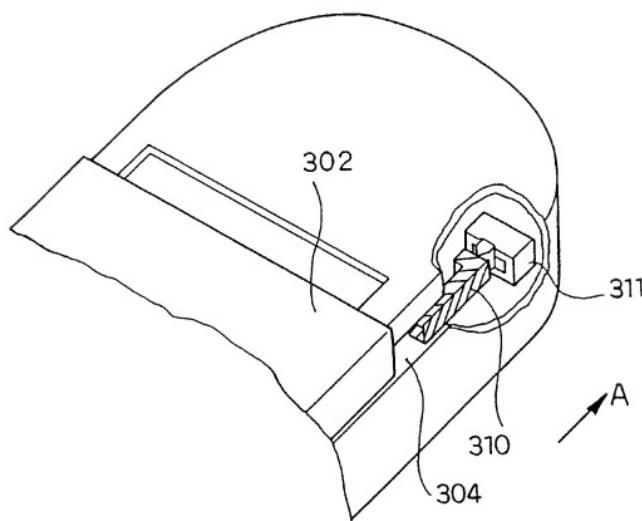


Fig.51

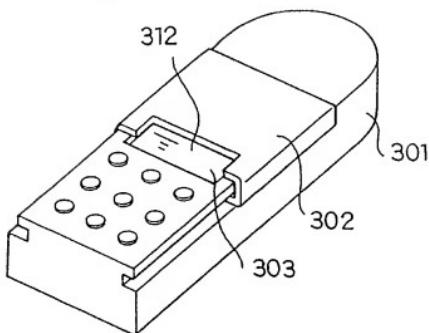


Fig.52

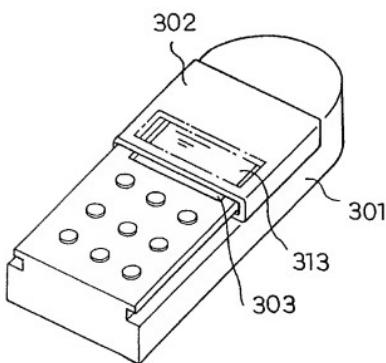


Fig.53

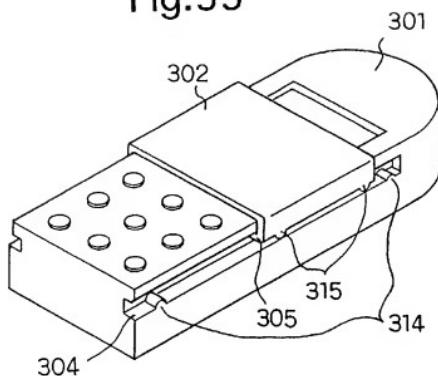


Fig.54

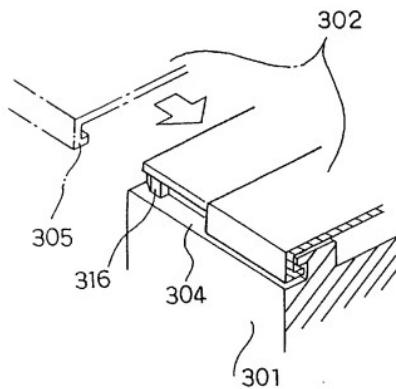


Fig.55

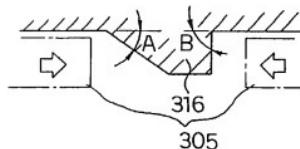


Fig.56

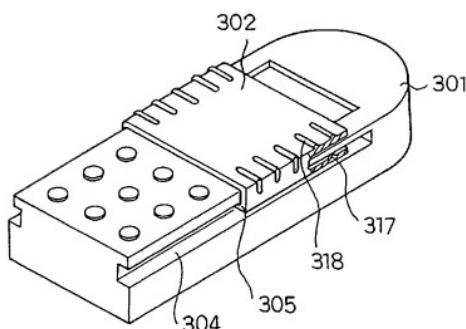


Fig.57

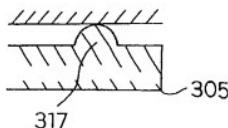


Fig.58  
RELATED ART

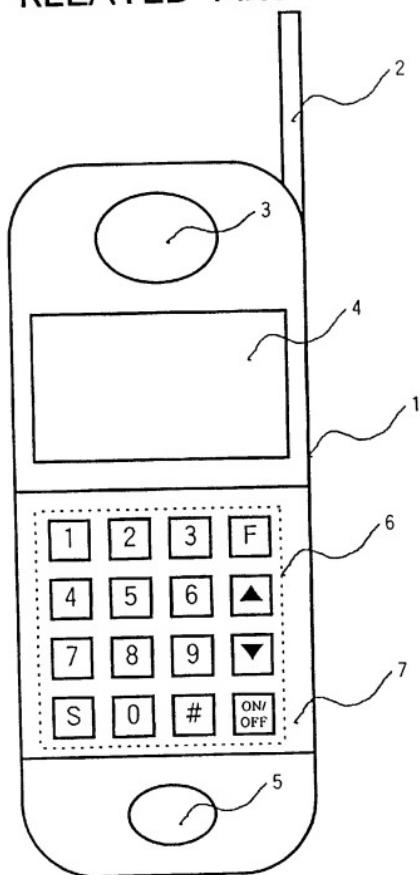
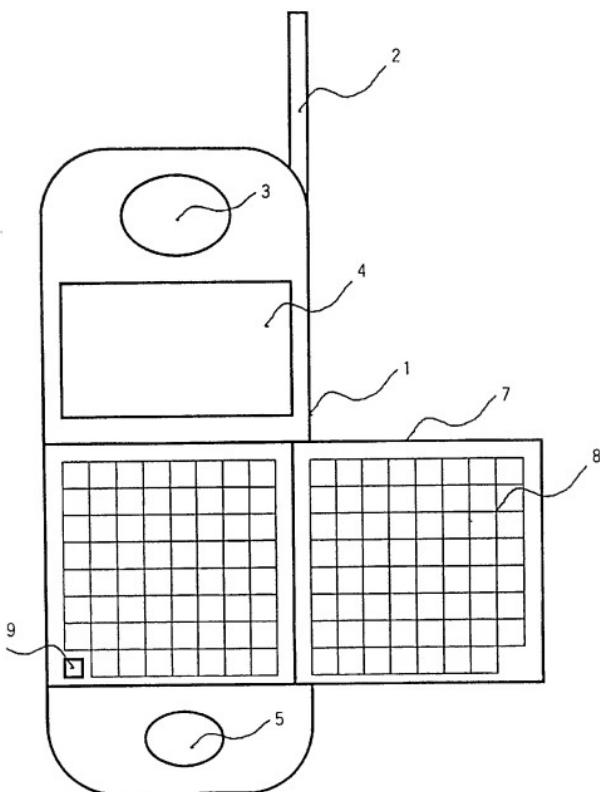


Fig.59  
RELATED ART



## Fig.60 RELATED ART

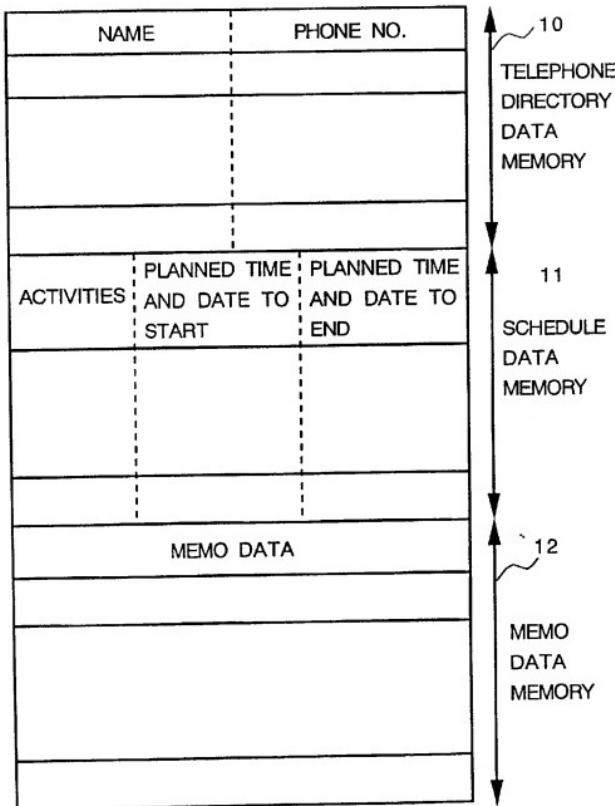


Fig.61  
RELATED ART

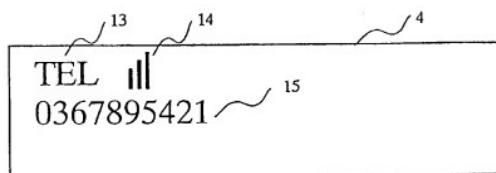


Fig.62  
RELATED ART

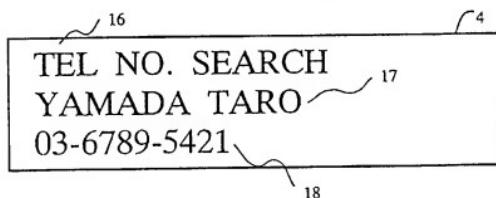


Fig.63  
RELATED ART



Fig.64  
RELATED ART

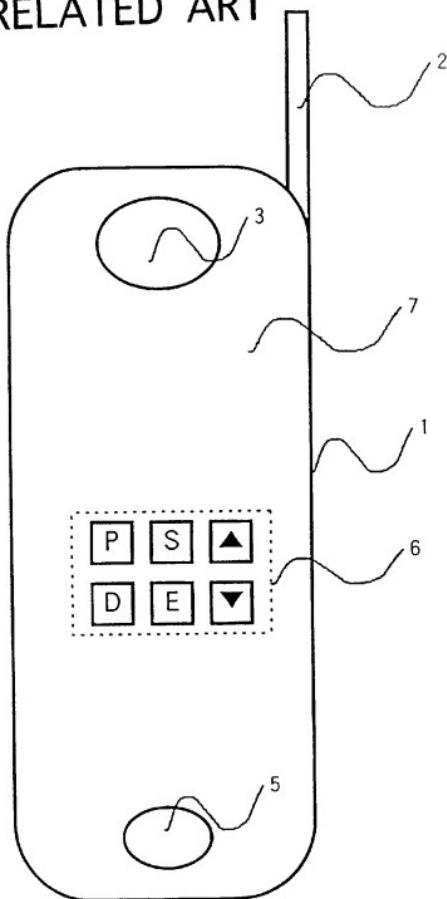


Fig.65  
RELATED ART

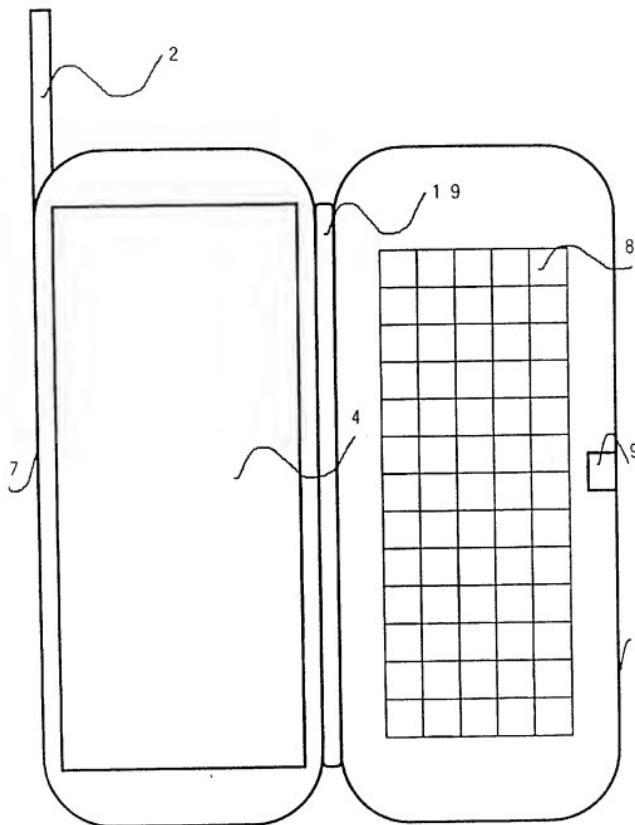


Fig.66 RELATED ART

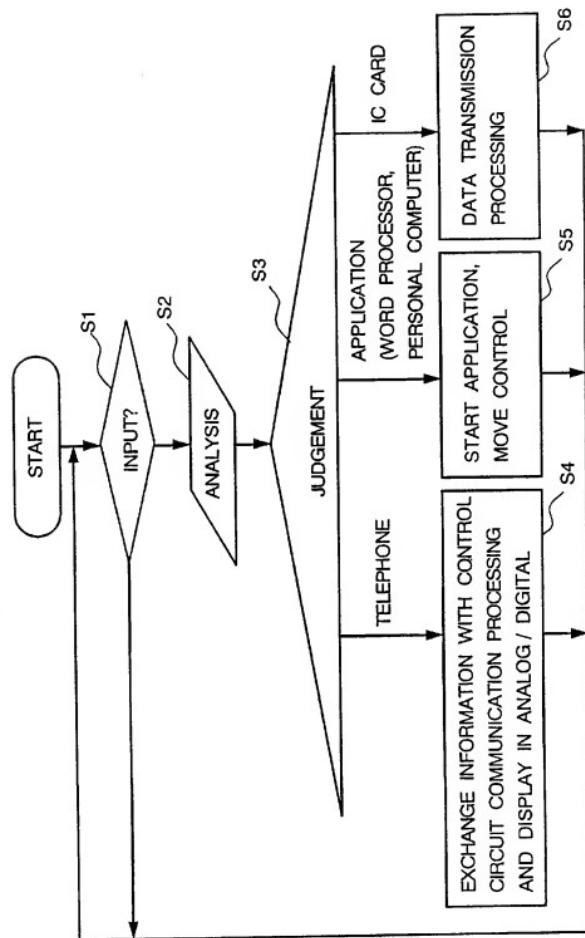
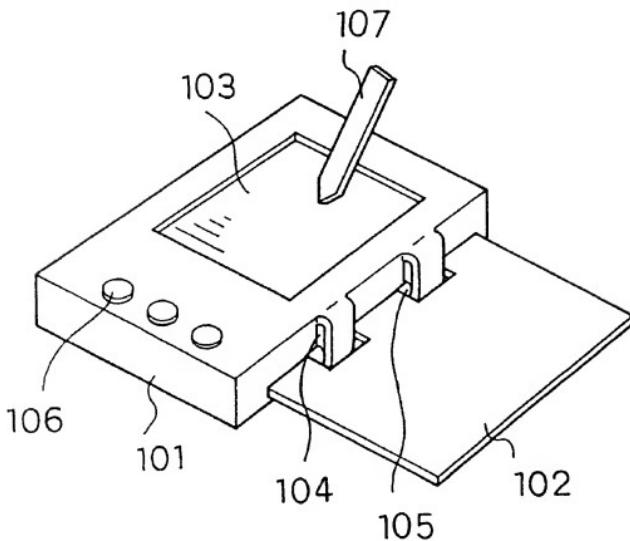


Fig.67  
RELATED ART



## MOBILE INFORMATION TERMINAL EQUIPMENT AND PORTABLE ELECTRONIC APPARATUS

### BACKGROUND OF THE INVENTION

The present invention relates to a mobile information terminal equipment, more particularly, to a mobile radio wave communication equipment, such as a mobile telephone, furnished with functions including electronic note, data communication, word processor, personal computer, and so on.

Moreover, the present invention relates to the communication control and user interface of a terminal for which the mobile radio wave communication equipment such as a mobile telephone and personal information management functions are combined.

Furthermore, the present invention relates to the structure of a cover for protecting an input display unit for the portable electronic apparatus such as a mobile information terminal equipment.

### BACKGROUND OF THE RELATED ART

As a conventional mobile information terminal equipment furnished with functions of a mobile telephone plus an electronic note, there is a mobile information terminal equipment disclosed in the official gazette of Japanese Unexamined Patent Publication No. HEI 5-211464 of Japan Patent Application. The outline of the Patent Publication No. HEI 5-211464 is given below.

FIG. 58 and FIG. 59 show the appearance of the conventional mobile information terminal equipment.

In FIG. 58, a body 1 of a mobile information terminal equipment, an antenna 2, a speaker 3, a liquid crystal display 4, a microphone 5, a telephone keyboard 6, and a cover 7 are illustrated.

FIG. 59 gives another front view with a cover 7 opened, showing an electronic note keyboard 8 and a cover switch 9.

Telephone keyboard 6 for dialing keys is placed on the top of cover 7 installed on a mobile information terminal equipment body 1. Electronic note Keyboard 8 for character data input keys is installed from the back of cover 7 to the area covered by cover 7. A telephone mode and an electronic note mode are switched based on the output from a cover switch 9, which detects the opened/closed status of cover 7. When the cover is closed, the telephone mode is set, enabling the user to use the equipment as a regular mobile telephone. Meanwhile, the electronic note mode is set as the cover is opened, thus allowing the user to use it as an ordinary electronic note.

FIG. 60 shows the memory configuration for storing electronic note data of the mobile information terminal equipment. The memory is the Random Access Memory (RAM) and incorporated in mobile information terminal equipment body 1 (not shown in FIG. 58 and FIG. 59).

A telephone directory data memory 10, a schedule data memory 11, and a memorandum data memory 12 are illustrated in FIG. 60.

Telephone directory data memory 10 stores a name and a telephone number input from electronic note keyboard 8 as a pair. Schedule data memory 11 stores the activities input from electronic note keyboard 8 and the planned time and date for starting and ending each activity as a triad. Memorandum data memory 12 stores data input from electronic note keyboard 8 collectively.

FIG. 61, FIG. 62, and FIG. 63 show examples of screens displayed on liquid crystal display 4. Character strings are

displayed on three lines on the screen. Line 1 shows a selected function, a mode name, and status information, and etc. Line 2 and line 3 show data input from telephone keyboard 6 or electronic note keyboard 8, and data read from the RAM (not shown).

In telephone mode, e.g., when the cover is closed, a "TEL" 13 indicating telephone mode and a mark 14 for receiving sensitivity appear on line 1. A dialed data "0367895421" 15 input by pressing the numeric keys on telephone keyboard 6 is displayed on line 3 (FIG. 61).

When the cover is opened, e.g., in electronic note mode, and in telephone directory data search mode, "TELNO. SEARCH" 16 is displayed on line 1. On line 2, a retrieved data, a name "YAMADA TARO" 17 is displayed and on line 3, its telephone number "03-6789-5421" 18 is displayed, respectively (FIG. 62). Displayed data is retrieved from telephone directory data memory 10 shown in FIG. 60 of the RAM (not shown) incorporated in mobile information terminal equipment body 1. When the cover is opened, data can be easily retrieved, input, modified, deleted, etc. using electronic note keyboard 8 which has alphabetic keys, kana keys, and so forth.

When the cover is closed in the status shown in FIG. 62, telephone mode starts and "TEL" 13 and mark 14 for receiving sensitively are added to the display at line 1 (FIG. 63). Pressing the S (SEND) key at this status enables the user to actually dial the displayed telephone number, because it is in telephone mode.

In this way, the mobile information terminal equipment disclosed in the official gazette Japanese Unexamined Patent Publication No. HEI 5-211464 is a mobile telephone set having an electronic note function for facilitating the input of character data by installing the operation keys for electronic note on both the rear sides of the opening/closing part attached to the main cabinet and on the body surface covered with the opening/closing part.

Another example of the conventional mobile information terminal equipment is disclosed in Japanese Unexamined Patent Publication No. HEI 06-284067 of Japan Patent Application. The mobile information terminal equipment is a mobile telephone with functions for a word processor or a personal computer.

FIG. 64 and FIG. 65 are the front views showing the appearance of the conventional mobile information terminal equipment.

FIG. 64 is the front view showing cover 7 in the closed status while FIG. 65 shows the front view of cover 7 in the opened status.

In FIG. 65, a hinge 19 is shown. For the conventional mobile information terminal equipment, cover 7 and mobile information terminal equipment body 1 are overlapped in parallel with the plane in the front view. Mobile information terminal equipment body 1 is coupled with cover 7 by hinge 19, which can hold the cover at a necessary position from the closed status to the opened status.

When the mobile information terminal equipment is used as a mobile telephone, as shown in FIG. 64, mobile information terminal equipment body 1 is overlapped with cover 7, and used with cover 7 in the closed status. The power source key P on telephone keyboard 6 is pressed. When there is a call-in, pressing down the send key S on telephone keyboard 6 enables a telephone talk. Furthermore, pressing down the one-touch key D on telephone keyboard 6 makes corresponding dial signals to be automatically transmitted, thus allowing a call-out. When a talk ends, the ending talk key E on telephone keyboard 6 is pressed.

To dial manually for a call-out, after the power source key P is pressed, cover 7 is opened. Then, a send key (not shown) of electronic note keyboard 8 is pressed, and the dial number is input from dial keys (not shown) of electronic note keyboard 8. After that, cover 7 is closed, and talking is enabled when the equipment is entered to a talk mode.

When using as a word processor or a personal computer, after the power source key P on telephone keyboard 6 is pressed with the cover in the closed status, cover 7 is opened, and with cover 7 in the opened status, designated keys (not shown) of electronic note keyboard 8 are operated to activate the application. Operating the input mode selection keys (not shown) of electronic note keyboard 8 to select either a kana or roman character input mode renders it possible to function as a word processor or to input necessary data into a personal computer. Moreover, input characters can be displayed on liquid crystal display 4 so that the input data can be confirmed.

FIG. 66 is a flowchart showing the execution of a processor (not shown) incorporated in mobile information terminal equipment body 1. The program shown in this flowchart is stored in the ROM incorporated in mobile information terminal equipment body 1.

The processor periodically detects whether or not an input has been made (S1). When an input is detected, it is analyzed (S2), and at the judgement step S3, as to detect whether or not the input is related to the telephone function, to the application, or to the read/write of the data of the Integrated Circuit (IC) card.

If the input is related to the telephone function, information is exchanged (S4) with a control circuit (not shown) (for example, information such as the send key is operated, or end-talk key is operated, etc., is transmitted, and when call-in information is received, corresponding necessary information is displayed, and so on).

If the input is related to the application, the corresponding application is activated, and the control is handed over to the application (S5). As the application software, a word processor software, communication software, database, table calculation software are pre-loaded or loaded from the IC card and stored in the RAM (not shown) incorporated in mobile information terminal equipment body 1.

If the input is related to the data read/write of the IC card, data transmission is implemented between the RAM (not shown) incorporated in mobile information terminal equipment body 1 and the IC card (S5).

For the mobile information terminal equipment disclosed in the Japanese Unexamined Patent Publication No. Hei 06-284067, the cabinet of the mobile radio telephone set is separated into two pieces on its surface parallel to the front surface, and on the facing surfaces, a display unit and keys for inputting characters are provided. Thus it provides a structure which does not damage the portability even when a large-size display and many keys are installed. The two pieces separated on the surface parallel to the front surface of the cabinet of the telephone set are coupled with a hinge, which permits the pieces to hold still in whichever position necessary from the closed to the opened status. When the two pieces are in the closed, overlapped status, dial operation or telephone talk is enabled by using the operation panel on which the one-touch dial key, end-talk switch, power source switch, etc., are provided. For using as a word processor or a personal computer, and not as a mobile telephone set, the two pieces are kept in the opened status, and the character data can be input by dint of a large-size display and many keys provided for the character input.

Meanwhile, for the structure of protective cover of the input display unit of the electronic apparatus, as disclosed in Japanese Unexamined Patent Publication No. Hei 04-85895 of the Japan Patent Application, a shaft is set on part of the protective cover, and the shape of the guide groove is modified with the shaft as the base, and a rotating or sliding structure is provided.

The Japanese Unexamined Utility Model Publication No. Hei 04-67381 of the Japan Utility Model Application discloses a lap-top electronic apparatus which has a groove in the protective cover to cover the display by sliding the cover.

However, above two structures expose the input display unit when they are used, and they simply protect the input display unit with the cover when they are not used. They serve only for the purpose of protecting the input display unit, but they do not serve to improve the protection of the key panel, steadiness, or operability.

For example, FIG. 67 shows a model of an electronic apparatus with a protective cover.

In the figure, an electronic apparatus body 101, a protective cover 102, an input display unit 103, a guide groove 104, a shaft 105, an operation button 106, and a pen 107 are illustrated.

The operation is explained next.

The electronic apparatus body 101 inputs data by pressing input display unit 103 with pen 107, and displays necessary information on input display unit 103. Besides, it has operation buttons such as switches. In order to protect input display unit 103, it has protective cover 102 having a shaft 105 which engages guide groove 104. The protective cover 102 is closed when the electronic apparatus is not in use. The protective cover is opened with the hinge structure when the electronic apparatus is to be used. Although not shown in the figure, changing the shape of guide groove 104 realizes different types of installing of the protective cover 102.

#### PROBLEMS TO BE SOLVED BY THE INVENTION

Because the conventional mobile information terminal equipment is configured as aforementioned, the disclosure in the Japanese Unexamined Patent Publication No. Hei 05-211464 renders it possible to increase the number of keys while retaining portability to a certain degree, facilitating the input operation and featuring additional functions to the electronic note. However, it is not able to enlarge the screen of the liquid crystal display, posing some problems in seeing the display screen. Furthermore, all functions and data of the electronic note are retrieved in sequential order, which inhibits the user from retrieving and obtaining the desired data instantaneously.

In addition, although the disclosure in the Japanese Unexamined Patent Publication NO. HEI 06-284067 made the screen of the liquid crystal display larger and the number of keys increased, it was not handy for using it with its cover opened (as a word processor or a personal computer) by holding with one hand, thus posing the problem of portability. On top of that, it was not easy to dial manually because the cover must be opened and closed.

Furthermore, both of the conventional equipments had the same problem. The conventional equipment does not work as a telephone while the cover is opened, and if the cover is opened during telephone talk, a desired screen would not appear. Besides, although functions for the computer and electronic note of inputting characters, etc., are realized with maintaining the portability of a mobile telephone to a certain

extent, the keys for telephone operation and the keys for character input operation must be provided separately. This required the increase in the number of physical keys in case of adding or extending the information processing functions other than the telephone, thereby sophistication of the mobile information terminal equipment had to face the problem from both aspects of the cost and the size.

Furthermore, the structure of the protective cover of the conventional electronic apparatus made it difficult to handle its opening or closing with one hand. It also had such problems of unintentionally pressing the switches while inputting with a pen. Or, the opening and closing structure was complex, it was prone to be broken, and the number of parts was increased. It also had a problem that it is not easy to hold the equipment in hand because the width of the equipment is increased at the opening and closing portion of the cover. It also had a problem that the cover was in the way when the cover was in the opened status.

As has been explained thus far, the protective cover of the conventional electronic apparatus had problems of operability and durability.

The present invention is aimed at overcoming above-mentioned problems. It aims at obtaining a mobile information terminal equipment that enables the user to telephone regardless of the status of its opened or closed cover. It is another object of the present invention to achieve the mobile information terminal equipment enabling the user to open or close the cover with ease during talking over the telephone. It is yet another object of the present invention to achieve a mobile information terminal equipment enabling the user to use functions for the electronic note, word processor, personal computer, etc., easily during talking over the telephone. It is another object of the present invention to obtain a mobile information terminal equipment excellent in portability with an easy-to-see screen and improved operability. It is further object of the present invention to achieve a mobile information terminal equipment which allows the extension of the information processing functions without adding physical keys, and which allows the use of the information processing functions and data communication functions effectively during telephone talk.

Furthermore, the present invention aims at solving the above mentioned problems, and at improving the operability and durability of the protective cover for the input display unit of the mobile electronic apparatus.

#### SUMMARY OF THE INVENTION

A mobile information terminal equipment may comprise a slide cover for sliding and covering part of a surface of the mobile information terminal equipment.

The mobile information terminal equipment may further comprise a display unit for displaying information on a display area in part of the surface of the mobile information terminal equipment, a location detector for detecting a location of the slide cover, and a display switch for changing a size of the display area for displaying information and a displaying direction of information according to the location of the slide cover detected by the location detector.

The mobile information terminal equipment may comprise a display unit for displaying an application screen, wherein information may be displayed in telephone mode when the mobile information terminal equipment may be used as a telephone set and in information terminal mode when the mobile information terminal equipment may be used as an information terminal, and wherein one of the applications among a plurality of applications, each of which may have

one or more application screens and display one of the application screens on the display unit may be executed in telephone mode, and a subsequent screen determinator for selecting possible subsequent screens among a plurality of application screens and for determining one application screen to be displayed among the possible subsequent screens in case of transitioning from telephone mode to information terminal mode.

The mobile information terminal equipment may further comprise a transition table for setting a transition condition and a subsequent screen in accordance with a use status in telephone mode, and wherein the subsequent screen determinator may determine the subsequent screen based on the transition table.

The mobile information terminal equipment may further comprise a user information setter for arbitrarily setting the subsequent screen as user information in accordance with the use status in telephone mode, and wherein the subsequent screen set as the user information may be retrieved as the possible subsequent screen based on which the subsequent screen may be determined.

The mobile information terminal equipment may further comprise a historical information storage for storing the use status in telephone mode and history of the subsequent screen, and wherein the subsequent screen stored in the historical information may be retrieved as the possible screen based on which the subsequent screen may be determined.

The mobile information terminal equipment may further comprise a talk log information storage for storing talk log information of telephone mode including the subsequent screen displayed during telephone talk, wherein the mobile information terminal equipment may be possible to transit from telephone mode to information terminal mode during telephone talk, and wherein the subsequent screen may be set based on the talk log information as one of the possible subsequent screens.

The mobile information terminal equipment may be, wherein data obtained in information terminal mode may be used in telephone mode after information terminal mode may be transitioned to telephone mode.

The mobile information terminal equipment may be, wherein the application may be possible to activate another application, and at least one of data displayed on a preceding application screen and data pertaining to the data displayed used in a preceding application screen and data may be displayed on a subsequent application screen, in information terminal mode.

The mobile information terminal equipment may further comprise a cover, and wherein the mobile information terminal equipment may be used in telephone mode irrespective of a location of the cover.

The mobile information terminal equipment may be, wherein the talk log information storage may further store the data concerning the subsequent screen during telephone talk as the talk log information, and the data may be displayed on the subsequent screen when the subsequent screen stored in the talk log information may be displayed.

The mobile information terminal equipment may further comprise a reservation application among the applications executed in information terminal mode, and wherein the reservation application may have an input screen on which information necessary for reservation may be input and then transmitted.

The mobile information terminal equipment may further comprise a voice output unit and a telephone keyboard used

in telephone mode, an application which may have an application screen on which data may be input/output in information terminal mode, and wherein an input request from an opposite party may be made by one of outputting the input request into the voice output unit and displaying the input request on the application screen display unit, and a response to the opposite party may be input from the telephone keyboard in telephone mode, wherein an input request from the opposite party may be displayed on the application screen and a response to the opposite party may be input onto the application screen in information terminal mode, and wherein the application may be executed in telephone mode and in information terminal mode.

The mobile information terminal equipment may be, wherein a content of the display unit in telephone mode may be selected and discarded before being displayed on the display unit when transitioning from information terminal mode to telephone mode.

The mobile information terminal equipment may comprise the telephone keyboard for inputting data in telephone mode, wherein the application may be executed by limiting its functions and by selecting and discarding the information to be displayed on the display unit in information terminal mode.

A mobile information terminal equipment having a body may comprise a display unit having a touch screen, a door having a display window on part of the display unit a switch button, a door opening/closing detector for detecting door opened/closed status, a first software module for providing a user interface when using as a telephone set in the door closed status, and a second software module for providing a user interface when using as an information processor in the door opened status.

The mobile information terminal equipment may be, wherein the first and the second software modules may share information for a telephone operation.

The mobile information terminal equipment may further comprise a third software module for providing a function to access the shared data.

The mobile information terminal equipment may be, wherein the mobile information terminal equipment may be used as a telephone set in the door closed status by the same operation as that for a mobile telephone with the switch button.

The mobile information terminal equipment may be, wherein characters and pictographs may be displayed on the display window of the door in the direction easier to see when the body may be vertically held in the door closed status.

The mobile information terminal equipment may be, wherein the touch screen may be located under the door and touched by pressing the switch button of the door in the door closed status, and a touch input may be mapped with the switch button of the door.

The mobile information terminal equipment may be, wherein the touch screen may be directly touched in the door opened status, and wherein a personal management information function, telephone, and data transmission may be enabled by graphic user interface (GUI) using a display screen.

The mobile information terminal equipment may be, wherein the characters and pictographs may be displayed on the display unit in the direction easier to see when the body may be horizontally held in the door opened status.

The mobile information terminal equipment may be, wherein the touch input may be mapped with the graphic user interface in the door opened status.

The mobile information terminal equipment may comprise a microphone and a speaker, and wherein the input sensitivity to the microphone and the output from the speaker may be adjustable so that the user may use the body in hand-free condition with ear and mouth released from the body when the door may be opened from the door closed status.

The mobile information terminal equipment may further comprise a microphone, a voice signal switch unit, a radio unit, and a modem, and a control unit for controlling the microphone, the voice signal switch unit, the radio unit and the modem, and wherein the control unit may instruct the voice signal switch unit to temporarily shut a path from the microphone to the radio unit during talk to validate a path from the modem to the radio unit, so as to switch the line used for the telephone to the modem to allow the user to halt the talk being conducted with hand-free condition and to transmit the data including the information written using the personal management function, and then may resume the talk upon completion of the data transmission.

A portable electronic apparatus may comprise an input display unit for inputting information and displaying the information, a key panel with switches, a body with the input display unit and the key panel allocated on a surface, and a slide cover mounted on the surface of the body for opening/closing the input display unit.

The portable electronic apparatus may be, wherein the slide cover may be used to select one of the input display unit and the key panel and to protect the covered other part.

The portable electronic apparatus may further comprise a rail on the body for sliding the slide cover.

The portable electronic apparatus may further comprise a support projection on the surface for supporting an inside of the slide cover.

The portable electronic apparatus may further comprise a switch on the rail for detecting opened/closed status of the slide cover.

The portable electronic apparatus may further comprise a cut-off part on the slide cover for displaying part of the input display unit even when it may be covered with the slide cover.

The portable electronic apparatus may further comprise a transparent part on the slide cover.

The portable electronic apparatus may further comprise the opening/closing support projection for the slide cover and the rail for keeping the slide cover in its opened/closed position.

The portable electronic apparatus may further comprise a projection on the rail for preventing the slide cover from falling off the body.

The portable electronic apparatus may further comprise a convex surface on the slide cover for facilitating a slide operation on the surface.

The portable electronic apparatus may further comprise the slide operation support projection on the slide cover for making the slide cover smoothly slide against the rail.

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

## BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

FIG. 1 is a front view showing the appearance of the mobile information terminal equipment of Embodiment 1 of the present invention;

FIG. 2 is a front view showing the appearance of the mobile information terminal equipment of Embodiment 1 of the present invention;

FIG. 3 shows an electrical configuration of the mobile information terminal equipment of Embodiment 1 of the present invention;

FIG. 4 is a figure explaining the operation (user interface) of the mobile information terminal equipment with its cover closed of the present invention;

FIG. 5 is a figure explaining the operation (user interface) of the mobile information terminal equipment with the cover closed of the present invention;

FIG. 6 is a figure showing an example of displaying a name list of an ADDRESS BOOK of the mobile information terminal equipment with its cover opened of the present invention;

FIG. 7 is a figure showing an example of displaying detailed information of an ADDRESS BOOK of the mobile information terminal equipment with its cover opened of the present invention;

FIG. 8 is a figure showing an example of displaying a monthly calendar of a SCHEDULE of the mobile information terminal equipment with the cover opened of the present invention;

FIG. 9 is a figure showing an example of displaying the detailed information of a SCHEDULE of the mobile information terminal equipment with the cover opened of the present invention;

FIG. 10 is a figure showing an example of displaying a MEMO of the mobile information terminal equipment with the cover opened of the present invention;

FIG. 11 is a figure showing an example of displaying a TALK LOG of the mobile information terminal equipment with the cover opened of the present invention;

FIG. 12 is a figure showing a display example of a TELEPHONE screen of the mobile information terminal equipment with the cover opened of the present invention;

FIG. 13 is a figure explaining the operation of moving from the cover closed to the cover opened status of the mobile information terminal equipment of the present invention;

FIG. 14 is a figure showing an example of transition table of the mobile information terminal equipment of the present invention;

FIG. 15 is a figure showing an example of the user information of the mobile information terminal equipment of the present invention;

FIG. 16 is a figure showing an example of historical information of the mobile information terminal equipment of the present invention;

FIG. 17 is a figure showing an example of a TALK LOG of the mobile information terminal equipment of the present invention;

FIG. 18 is a flowchart explaining the operation of moving from the cover closed to the cover opened status of the mobile information terminal equipment of the present invention;

FIG. 19 is a front view showing the appearance of the mobile information terminal equipment of Embodiment 1 of the present invention;

FIG. 20 is a front view showing the appearance of the mobile information terminal equipment of Embodiment 1 of the present invention;

FIG. 21 is a figure explaining the operation (user interface) of the mobile information terminal equipment with the cover in the closed status of the present invention;

FIG. 22 is a figure explaining the operation (user interface) of the mobile information terminal equipment with the cover in the closed status of the present invention;

FIG. 23 is a figure explaining the operation for moving from the cover opened to the cover closed status of the mobile information terminal equipment of one Embodiment of the present invention;

FIG. 24 is a figure of a TELEPHONE screen explaining the operation of moving from the cover opened status to the cover opened status of the mobile information terminal equipment of the present invention;

FIG. 25 is a figure of a display screen of telephone mode explaining the operation for moving from the cover opened status to the cover closed status shown in FIG. 24 of the mobile information terminal equipment;

FIG. 26 is a figure of a TELEPHONE screen explaining the operation for moving from the cover opened to the cover closed status of the mobile information terminal equipment of the present invention;

FIG. 27 is a figure of a display screen of telephone mode for explaining the operation of moving from the cover opened status to the cover closed status shown in FIG. 26 of the mobile information terminal equipment;

FIG. 28 is a figure of an ADDRESS BOOK screen explaining the operation for moving from the cover opened status to the cover closed status of the mobile information terminal equipment of the present invention;

FIG. 29 is a figure of a display screen of telephone mode explaining the operation for moving from the cover opened to the cover closed status of FIG. 28 of the mobile information terminal equipment;

FIG. 30 is a figure showing an example of data format of an ADDRESS BOOK stored in the RAM of the mobile information terminal equipment of the present invention;

FIG. 31 is a figure showing an example of a screen for seat reservation of the mobile information terminal equipment with the cover opened of the present invention;

FIG. 32 is a front view of the mobile information terminal equipment with the door closed of the present invention;

FIG. 33 is a front view of the mobile information terminal equipment with the door opened of the present invention;

FIG. 34 is a sectional view of the mobile information terminal equipment in the door closed status of the present invention;

FIG. 35 shows the appearance for using the mobile information terminal equipment as a mobile phone in accordance with Embodiment 6 of the present invention;

FIG. 36 is a figure showing a use status for using the mobile information terminal equipment as the portable personal information management apparatus in accordance with Embodiment 6 of the present invention;

FIG. 37 is an explanation figure (1) of character display method of the mobile information terminal equipment in accordance with Embodiment 6 of the present invention;

FIG. 38 is an explanation figure (2) of character display method of the mobile information terminal equipment in accordance with Embodiment 6 of the present invention;

FIG. 39 is an explanation figure (3) of character display method of the mobile information terminal equipment in accordance with Embodiment 6 of the present invention;

FIG. 40 is an explanation figure (4) of character display method of the mobile information terminal equipment in accordance with Embodiment 6 of the present invention;

FIG. 41 is an explanation figure (5) of character display method of the mobile information terminal equipment in accordance with Embodiment 6 of the present invention;

FIG. 42 is a block diagram showing a configuration of the mobile information terminal equipment with its door closed in accordance with Embodiment 6 of the present invention;

FIG. 43 is a figure showing a screen display example of the mobile information terminal equipment with its door closed in accordance with Embodiment 6 of the present invention;

FIG. 44 is a figure showing a screen display example during dial operation of the mobile information terminal equipment with its door closed in accordance with Embodiment 6 of the present invention;

FIG. 45 is a figure showing a screen display example of the mobile information terminal equipment with its door opened in accordance with Embodiment 6 of the present invention;

FIG. 46 is a flowchart showing a display switching procedure by opening/closing the door of the mobile information terminal equipment in accordance with Embodiment 6 of the present invention;

FIG. 47 shows a slide cover in the closed status for the portable electronic apparatus of one Embodiment of the present invention;

FIG. 48 shows a slide cover in the opened status for the portable electronic apparatus of one Embodiment of the present invention;

FIGS. 49A and 49B show a portable electronic apparatus of one Embodiment of the present invention;

FIG. 50 shows part of a rail of the portable electronic apparatus of one Embodiment of the present invention;

FIG. 51 shows a portable electronic apparatus of one Embodiment of the present invention;

FIG. 52 shows a portable electronic apparatus of one Embodiment of the present invention;

FIG. 53 shows a portable electronic apparatus of one Embodiment of the present invention;

FIG. 54 shows part of a rail of the portable electronic apparatus of one Embodiment of the present invention;

FIG. 55 is a sectional view showing a projection for preventing the slide cover from falling off the main body for the portable electronic apparatus of one Embodiment of the present invention;

FIG. 56 shows a portable electronic apparatus of one Embodiment of the present invention;

FIG. 57 is a sectional view of a projection of a slide operation support of the portable electronic apparatus of one Embodiment of the present invention;

FIG. 58 is a front view showing an apparatus of the conventional mobile information terminal equipment;

FIG. 59 is a front view showing the appearance of the conventional mobile information terminal equipment;

FIG. 60 shows the configuration of memory memorizing the electronic note data of the conventional mobile information terminal equipment;

FIG. 61 shows an example of a screen displayed on liquid crystal display 4 of the conventional mobile information terminal equipment;

FIG. 62 shows an example of a screen displayed on liquid crystal display 4 of the conventional mobile information terminal equipment;

FIG. 63 shows an example of a screen displayed on liquid crystal display 4 of the conventional mobile information terminal equipment;

FIG. 64 is a front view showing the appearance of another conventional mobile information terminal equipment;

FIG. 65 is a front view showing the appearance of another conventional mobile information terminal equipment;

FIG. 66 is a flowchart showing an operation of another conventional mobile information terminal equipment; and

FIG. 67 shows a cover of the conventional portable electronic apparatus.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

##### Embodiment 1

Embodiment 1 of the mobile information terminal equipment of the present invention is explained below with reference to figures. Firstly, the mechanical configuration of the mobile information terminal equipment of the present invention is explained with FIGS. 1 and 2.

FIG. 1 and FIG. 2 are the front views showing the appearance of the mobile information terminal equipment according to the present invention.

In FIG. 1 and FIG. 2, a touch screen 20 is a transparent tablet on which the coordinate can be input with a pen (not shown) or by touching it with a finger. The configuration elements, the same parts, or corresponding parts explained in the conventional examples are given the same reference numbers and their explanation is omitted.

Touch screen 20 is attached on liquid crystal display 4, and constituting an input/output device (called the liquid crystal tablet) used for display and input operation. For the mobile information terminal equipment of this Embodiment, cover 7 moves (slides) up and down along the plane surface 30 on the drawing shown in FIG. 1 and FIG. 2. FIG. 1 shows that cover 7 is at the top and FIG. 2 shows cover 7 at the bottom. In contrast with the conventional mobile information terminal equipment, FIG. 1 is referred to as the status in which the cover is closed (cover closed status) and FIG. 2 is referred to as the status in which the cover is opened (cover opened status).

As a location detector for detecting a location of cover 7, a cover switch 9 is employed. Cover switch 9 detects the opened/closed status of cover 7, and if the cover is in the closed status, telephone mode is set. If the cover is in the opened status, information terminal mode is set and used as an information terminal equipment.

In the cover closed status (FIG. 1), the appearance becomes a mobile telephone, telephone keyboard 6 can be used, and only the bottom part of liquid crystal display 4 is exposed, and only the exposed part can be used. On the other hand, in the cover opened status (FIG. 2), although the entire liquid crystal display 4 is exposed, telephone keyboard 6 is hidden and unavailable. In this status, normally it is turned by 90 degrees, and used with its right side before the user, as shown in FIG. 2.

Even during telephone talk, the cover can be easily opened by sliding the cover 7 with the hand holding mobile information terminal equipment body 1. In the cover opened status, by holding the side of microphone 5 of mobile information terminal equipment body 1 with the left hand,

data input or menu selection, etc., can be easily done by holding a pen (not shown) with the right hand or by touching touch screen 20 with the fingertip of the right hand. In addition, because the screen becomes horizontally long, it becomes easy to see the screen in light of the user interface.

The electrical configuration of the mobile information terminal equipment of the present invention is explained next using FIG. 3.

In FIG. 3, a processor 21, an audio processor 22, a radio transmission unit 23, a Read Only Memory (ROM) 24, a Random Access Memory (RAM) 25, and a power source 26 are illustrated. These components are incorporated in mobile information terminal equipment body 1.

Processor 21 handles the digital data and implements functions of the electronic note, word processor, personal computer, etc., and controls liquid crystal display 4, touch screen 20, and the input/output of telephone keyboard 6, and performs the controlling according to the cover opening/closing signal sent from cover switch 9. Programs executed by this processor are stored in ROM 24, and various application data is kept in RAM 25. To prevent unintended activation, processor 21 stops the operation of touch screen 20 in the cover closed status, and stops the operation of telephone keyboard 6 in the cover opened status.

Audio processor 22 handles analog data, and performs the input/output control of speaker 3 and microphone 5 of the telephone function. Radio transmission unit 23 conducts processing related to the radio, such as the high-frequency modulation and demodulation of the mobile telephone. Furthermore, power source 26 supplies power to processor 21, audio processor 22, and so on.

The operation of cover closed status of the mobile information terminal equipment regarding the present invention is explained next, specifically centering on the user interface, with FIG. 4 and FIG. 5.

FIG. 4 and FIG. 5 show examples of screens displayed on liquid crystal display 4, corresponding to FIG. 61 and FIG. 62, respectively, showing a sample screen of the conventional mobile information terminal equipment.

The examples in FIG. 4 and FIG. 5 show the screens by placing the right side of the front view of the appearance of the mobile information terminal equipment of the present invention shown in FIG. 1 at bottom.

A difference in display of the mobile information terminal equipment between the present invention and the conventional art is the contents on the screen are turned by 90 degrees leftward. In the cover closed status, because cover 7 shown in FIG. 1 covers liquid crystal display 4, the right side of liquid crystal display 4 shown in FIG. 4 and FIG. 5 cannot be used. Viewed from the case using in the cover opened status as the reference, the screen is turned by 90 degrees. Based on the output from cover switch 9 which detects the location of cover 7, a display switch (not shown) limits the display area of liquid crystal display 4 to the area shown in FIG. 1, and performs turning processing for the display characters and symbols by 90 degrees. For instance, for this 90-degree turning processing, the character font stored in ROM 24 is read, turning processing is implemented by processor 21, and then the content is displayed on liquid crystal display 4. In the cover closed status, touch screen 20 is in a sleeping status, and thus does not respond to a touch made with a pen or a finger.

The operation of the mobile information terminal equipment of the present invention in its cover opened status is explained next, especially focusing on the user interface using FIGS. 6 through 12.

Drawings in FIGS. 6 to 12 show the examples of the application screens (hereinafter, the screens) displayed on liquid crystal display 4.

FIG. 6 is a drawing showing a screen example displaying a name list of the ADDRESS BOOK. FIG. 7 is a drawing showing a screen example of displaying a detailed information of the ADDRESS BOOK. FIG. 8 is a drawing showing a screen example displaying a monthly calendar of the SCHEDULE. FIG. 9 is a drawing showing a screen example displaying detailed information of the SCHEDULE. FIG. 10 is a drawing showing a screen example displaying the MEMO. FIG. 11 is a drawing showing a screen example displaying the TALK LOG. And FIG. 12 is a drawing showing a screen displaying a case for making a phone call in the cover opened status.

FIG. 6 is explained first.

The display screen of liquid crystal display 4 contains four major areas, (1) a content area 27, (2) a tag area 28, (3) a scroll area 29, and (4) a menu area 30. Content area 27 displays various instruction information, and the user can select desired information out of the displayed content or input information. For the example of FIG. 6, a name list of the ADDRESS BOOK is displayed, and the user selects MATSUURA JIRO among them.

Tag area 28 displays tags related to the information displayed in content area 27. When a tag is selected, the top data of the corresponding index is displayed on content area 27. For the example of FIG. 6, because NAME LIST is displayed, the vowel "A" and syllables "KA", "SA", "TA", "NA", "HA", "MA", "YA", "RA", and "WA" ending with "A" of the Japanese alphabets and the first four letters "A", "B", "C" and "D" from the English alphabets are displayed on the tag. Although English alphabets are displayed from "A" through "D" in this example, touching the scroll button "▼" on tag area 28 on the right bottom of the screen allows the tag display to sequentially scroll upward, thus enabling the selection of an alphabet from "E" down to "Z". In this example, if "MA" is touched and selected, for instance, MAEKAWA HANAKO (not shown in FIG. 6) is displayed at the top of the name list on content area 27.

Scroll area 29 is used to see the data in the neighborhood of the data displayed in content area 27. For instance, it is used to see the next page when the whole data cannot be displayed at once in content area 27. Touching the scroll buttons "A" and "▼" on the top and the bottom in scroll area 29 allows the hidden information to appear on the screen.

Menu area 30 displays the functional level menu. When a desired function is touched and selected from the menu, the function is activated and data is displayed on content area 27. For the example shown in FIG. 6, the name data of Japanese Kanji characters and Roman characters displayed in content area 27 is obtained by selecting the ADDRESS BOOK in menu area 30. The menu displayed in menu area 30 can be partially changed case by case so that the function can be easily activated even when the menu is hierarchical. Meanwhile, the basic functional-level menus are always displayed so that any one of the basic functions can be selected at any stage. The five basic functions in this example are the TALK LOG, MEMO, SCHEDULE, ADDRESS BOOK and TELEPHONE functions.

FIG. 7 is explained next.

As shown in FIG. 6, in the state in which the name list of the ADDRESS BOOK is displayed in content area 27, if MATSUURA JIRO displayed in content area 27 is double touched, or MATSUURA JIRO displayed in content area 27

is touched, and then the DETAILS displayed in menu area 30 is touched, content area 27 displays the screen of DETAILS of the ADDRESS BOOK as in FIG. 7. And in content area 27, HOME ADDRESS, HOME PHONE, HOME FAX, COMPANY NAME, DEPT. POSITION, OFFICE ADDRESS, OFFICE PHONE, OFFICE FAX, and etc., corresponding to the name MATSUURA JIRO are displayed. If HOME PHONE is double touched, for instance, the telephone function, which will be explained later, is activated, and after the S button is touched, a telephone call can be made. At this stage, if the NAME LIST displayed in menu area 30 is touched, the status (the screen) shown in FIG. 6 can be recovered.

FIG. 8 is explained next.

When the SCEDULE in menu area 30 is touched, the MONTHLY CALENDAR screen appears as shown in FIG. 8, and the calendar for this month is displayed in content area 27. Because the date becomes the retrieval key for the SCEDULE, for instance, months are displayed in tag area 28. Similarly to the above-mentioned address book, the desired month can be displayed as the tag by touching the scroll buttons "Δ" or "▽" in tag area 28, and when the tag is touched, the screen displays the desired month, that is, the calendar for the desired month can be displayed in content area 27.

FIG. 9 is displayed next.

In the state in which MONTHLY CALENDAR of the SCEDULE is displayed in content area 27, if the date "16" on the calendar of January 1996 is double touched or the date 16 displayed in content area 27 is touched, and then if the DETAILS displayed in menu area 30 is touched, content area 27 displays the screen of the DETAILS of the SCEDULE as in FIG. 9. In content area 27, the schedule table (bar) by time corresponding to the date "16" is displayed on the top of content area 27. If the MANAGER MEETING displayed on the schedule table in content area 27 is touched, MEMO which is the detailed information corresponding to the MANAGER MEETING is displayed on the bottom of content area 27. If the MONTHLY CALENDAR displayed in menu area 30 is touched at this stage, the state (the screen) shown in FIG. 8 can be recovered.

FIG. 10 is explained next.

When the MEMO in menu area 30 is touched, the MEMO screen appears as shown in FIG. 10. Various word-processor functions (edit command, etc.) are displayed in content area 27, and characters can be input. Touching the KEYBOARD displayed in content area 27 displays the screen keyboard and, thereby enables the input of characters at the screen keyboard. Furthermore, by touching the PEN, hand-written characters or diagrams can be input by the pen. Through the character recognition, input hand-written characters or diagrams can be converted into the character code. In addition, the basic edit functions of the word processor, such as the deletion of input characters, character insertion to an arbitrary location, duplication, cutting, and pasting of arbitrary character strings, etc., can be used.

Moreover, not only characters but also voices can be input through microphone 5 and attached to the memo as a voice memo 31. Touching the attached voice memo 31 permits the replay of the recorded voice memo 31.

In this case, menus such as the TALK LOG, SCEDULE, ADDRESS BOOK, MEMO, etc., are displayed on the left, and the schedule date is displayed on the right side of tag area 28. The display on the right side tag varies depending on the preceding menu. FIG. 10 shows the case moved from the SCEDULE shown in FIG. 9. Double touching one of

the tags displayed on the right in tag area 28 (for instance, the date "17") allows the screen to show the MEMO of the SCEDULE of that date (Jan. 17, 1996), without once returning to the SCEDULE.

On the other hand, the left tags in tag area 28 are used to link the preceding screen with the current screen. For instance, if the SCEDULE is touched on tag area 28 on the MEMO screen of FIG. 10, the memo data written here is linked to the SCEDULE for Jan. 16, 1996. In FIG. 10, after the date "17" on tag area 28 is touched, if the SCEDULE on tag area 28 is touched, the memo data written here is linked with Jan. 17, 1996 of the SCEDULE. If the function on menu area 30 is touched instead of touching the tag, the current screen is not linked with the next screen.

FIG. 11 is explained next.

When the TALK LOG on menu area 30 is touched, the TALK LOG screen appears as shown in FIG. 11. The date, the opposite party on the line, etc., are displayed in content area 27. For content area 27 of FIG. 11, □ indicates fax transmission, ■ fax receiving, ○ telephone call out, ● telephone call in, Δ mail transmission, and the black Δ indicates mail reception. The ME, SCH., and ADD. indicate that the memo, schedule, and address book exist corresponding to the telephone talk. When the ME, SCH., and ADD. are touched, each screen corresponding to the ME, SCH., and ADD. of the telephone talk appears.

In this case, the date tags are displayed on the left side and the memo tags are displayed on the right in tag area 28. When one of the date tags on the left is touched, one page of the TALK LOG corresponding to the touched date appears from the top in content area 27. If one of the memo tags on the right (for instance MEMO) is touched, the corresponding screen (the MEMO screen in this case) appears and the subsequent screen (the MEMO screen in this case) is linked and corresponded to the TALK LOG which has been selected on the preceding screen.

FIG. 12 is explained next.

When the TELEPHONE is touched on menu area 30, the TELEPHONE screen appears as shown in FIG. 12. A telephone set is displayed in content area 27, and a telephone call can be made. This screen appears when the home phone is double touched on the ADDRESS BOOK screen shown in FIG. 7, or when the log relating to the telephone is double touched on the TALK LOG screen of FIG. 11. In this case, the telephone number shown in the preceding screen is displayed on telephone number display window 32. When the send button S is touched, a telephone call can be made.

By touching the numeric buttons on the TELEPHONE screen shown in FIG. 12, a telephone number can be input manually, and then touching the send button S also allows the telephone call to be made. Just like a regular telephone, functions such as radial, speed dial, and one-touch dial are provided, each of which enabling a telephone call to be easily made by simply touching it. In the cover opened status, because the opposite parties and their numbers registered for the radial and one-touch dial are visually displayed as shown in FIG. 12, a very handy and easy-to-use user interface can be provided.

With the speed dial, touching the tag displayed in tag area 28 allows the telephone number and the opposite party registered to be displayed. FIG. 12 shows an example of a screen displayed in content area 27 when tag "21" on the left tag area 28 is touched. The telephone number (09) 9999-9999 and the name ASUKA stored at the 21st memory area are displayed to the right of the SPEED DIAL button. To select a number not displayed on the tag in tag area 28,

touching the scroll buttons "A" and "V" shown in tag area 28 allows it to be displayed. The menu tags displayed on the right side of tag area 28 are the same as those explained for the TALK LOG with FIG. 11.

With FIG. 13, the subsequent screens which can be displayed at the time of the transition from telephone mode (the cover closed status) to the cover opened status are explained next.

There can be four statuses in telephone mode, a STAND BY status 33, a DIALING status 34, a TALKING status 35, and a TELEPHONE DIRECTORY OPERATING status 36. Meanwhile, as the subsequent screens for transitioning to the cover opened status, the TELEPHONE screen 37, TALK LOG screen 38, MEMO screen 39, SCHEDULE screen 40, and ADDRESS BOOK screen 41 can be considered.

If, for instance, the cover is opened during the STAND BY status 33, the user may want to use a screen of either the TALK LOG screen 38, MEMO screen 39, SCHEDULE screen 40, or ADDRESS BOOK screen 41. Because it is in the STAND BY status 33, there are cases immediately transit to TELEPHONE screen 37. If the cover is opened during the DIALING status 33, the TELEPHONE screen 37, TALK LOG screen 38, and ADDRESS BOOK screen 41 are the screens which the user may want to use. Because it is in the DIALING status 34, there are few cases to immediately transit to the MEMO screen 39 or SCHEDULE screen 40. If the cover is opened during the TALKING status 35, the user can use either the MEMO screen 39, SCHEDULE screen 40, or ADDRESS BOOK screen 41. Because it is in the TALKING status 35, there are few cases to immediately transit to TELEPHONE screen 37 or TALK LOG screen 38. Furthermore, if the cover is opened during the TELEPHONE DIRECTORY OPERATING status 36, ADDRESS BOOK screen 41 is the only screen available to the user.

In opening the cover, because the subsequent screens which can be displayed are limited as explained above, it is possible that the subsequent screen can be automatically decided. Therefore, the number of touch operations can be reduced to improve the operability. By reducing the time to display the appearing screen, the call charge can be cut in case that the operation is taken in the TALKING status 35.

Among several possible subsequent screens from the TELEPHONE status shown in FIG. 13, how to decide which subsequent screen to be displayed is explained next.

FIG. 14 shows an example of a transition table 42 stored in ROM for the subsequent screen at the time of opening the cover.

On transition table 42, a TELEPHONE status 43, subsequent screen 45 when the cover is opened, and transition condition 44 for the subsequent screen are described. Some examples of transition conditions 44 are the presence or absence of user setting, the presence or absence of history setting, or the presence or absence of corresponding TALK LOG. The presence or absence of user setting indicates, when transitioning from telephone mode to information terminal mode, whether or not the user has set the subsequent screen as the user information for each status of telephone mode. The presence or absence of the history setting indicates whether or not each status of telephone mode and the history of subsequent screen are stored when transitioning from telephone mode to information terminal mode. The presence or absence of a talk log indicates, since the screen can be transitioned to screen for information terminal mode, which are the MEMO screen, SCHEDULE screen, or ADDRESS BOOK screen, from telephone mode, whether or not the talk log information of the TELEPHONE including

these subsequent screens during talk has been stored. Although the values on transition table 42 are expressed with words for the purpose of explanation, actually, they are coded.

The user can set, clear, or update the values for TELEPHONE status 43, transition condition 44, and subsequent screens 45 on transition table 42. In this case, transition table 42 is stored in RAM 25.

The user information setting means (not shown) stores user information in RAM 25. The user can set, clear, and update the user information.

FIG. 15 shows one example of the user information stored in RAM 25. For user information 46 in this example, subsequent screen 48 can be set for each TELEPHONE status 47. If the user has not set any subsequent screen 48, for instance, "—" is stored. Although the values of user information 46 are expressed with words for the purpose of explanation, actually, they are coded.

A historical information setting means (not shown) stores the historical information in RAM 25.

It is also possible for the historical information setting means to automatically acquire the historical information and store it in RAM 25 only when it is set to do so. The historical information setting means could be realized by a program which is loaded from RAM 25 and executed by processor 21. It is also possible that a hardware or firmware which acquires the historical information and stores it in RAM 25 realizes the historical information setting means

FIG. 16 gives an example of storing the historical information in RAM 25. In this example, historical information 49 contains items of a history number 50, a TELEPHONE status 51, a transition direction 52, and a screen 53. Historical information 49 is stored consecutively from the information having lower history number 50, and if the number of information exceeds the designated storage area, the information is deleted consecutively from the one having the oldest number (from lowest history number 50).

With reference to FIG. 16, how to store historical information 49 is explained next.

In the example of FIG. 16, the last status with the cover closed status is stored in the column for TELEPHONE status 51 for history number 50 "1". In this example, STAND BY status 33 is stored. Then, when the cover is opened, "→" is stored in the column of transition direction 52 for history number 50 "1". Further, the first screen displayed when the cover is opened is stored in the column of screen 53 for history number 50 "1". In this example, the MEMO screen is stored. Subsequent screens after the first screen with the cover opened status are not stored in historical information 49. The screen immediately before the cover closing is stored in the column of screen 53 for history number 50 "2". In this example, TALK LOG screen 38 is stored.

When the cover is closed, "←" is stored in the column of transition direction 52 for history number 50 "2". Then, the first TELEPHONE status entered after the cover is closed is stored in the column of TELEPHONE status 51 for history number 50 "2". In this example, TALKING status 35 is stored. Statuses after the first TELEPHONE status in the cover closed status are not stored in historical information 49, and the status immediately before the cover opening is stored in the column of TELEPHONE status 51 for history number 50 "3". In this example, STAND BY status 33 is stored. After that, historical information 49 is consecutively stored in the same manner.

For the historical information, the two consecutive numbers in history number 50, an odd and an even, pair up one

block. For example, "1" and "2" in history number 50 form one block. The columns of transition direction 52 are added only for the sake of explanation. Although the values in the columns of historical information 49 are expressed with words for the purpose of explanation, actually, they are coded. Moreover, the above manner of storing the screen or status immediately before the cover closed or opened status can be realized by overwriting in the pertinent column whenever the screen or the status has changed.

A talk log information setting means (not shown) automatically acquires TALK LOG 38 and stores it in RAM 25.

FIG. 17 shows an example of TALK LOG 38 stored in RAM 25. Talk log information 54 contains items for talking type 55, talk time and date 56, phone No. 57, opposite party 58, and pointers 59, 61, and 63 indicating the top address at which data the user obtained by operating on the subsequent screen is stored, and subsequent screen types 60, 62, and 64. Item names are abbreviated in FIG. 17 due to spacing. Values given in FIG. 17 correspond to the TALK LOG screen shown in FIG. 11. Although the values in each column of talk log information 54 are expressed with words for the purpose of explanation, actually, they are coded.

The storing method for talk log information 54 is next explained using FIG. 17.

Irrespective of the cover closed or opened status, type 55, talk time and date 56, phone No. 57, and opposite party 58 are stored in the pertinent columns in next line each time a telephone talk has been made. Then, when a screen is changed automatically by the system or by the user operation, the type of the subsequent screen is stored in the column of subsequent screen type 60, and the top address at which the data the user obtained on that screen is stored in the pertinent column of pointer 59. When the screen is changed after the user changed the type of the screen, the type of the subsequent screen is stored in the column of subsequent screen type 62, and the top address of the data is stored in the column of pointer 62 of the pertinent line, respectively. In the example of FIG. 17, up to 3 types can be stored. If the subsequent screen has four or more different types, the subsequent screens at the fourth and after are not stored in talk log information 54.

The flowchart in FIG. 18 outlines the processing flow of deciding the subsequent screen in transitioning from telephone mode to information terminal mode.

With reference to FIGS. 15 to 18, the procedure of deciding which screen to be displayed is explained with transition table 42 shown in FIG. 14.

At step S101, transition table 42 is scanned to get the transition condition 44 for the current TELEPHONE status 43. At step S102, the information to be referenced by the transition condition 44 is checked. If the transition condition 44 on transition table 42 is the user information, the process forwards to step S103. At step S103, user information 46 is scanned. At step S102, if transition condition 44 on transition table 42 indicates the presence of talk log information, at step S104, talk log information 54 is scanned. At step S102, if transition condition 44 on transition table 42 indicates the presence of the history setting, at step S105, historical information 49 is scanned. After step S103, step S104, and step S105, at step S107, whether or not the subsequent screen has been identified is checked, and if it has been successfully identified, the process is forwarded to step S108. At step S108, screen transition processing is performed. That is, the subsequent screen displayed on liquid crystal display 4 when this status is transited from the cover closed to the cover opened status, concluding pro-

cessing. At step S107, whether or not the subsequent screen has been identified is checked, and if failed, processing is repeated again from step S101.

With reference to FIGS. 15 to 18, the procedure of deciding which screen to be displayed is explained in concrete.

The operation of deciding the screen to be displayed in transitioning from telephone mode to information terminal mode is performed by a subsequent screen decision means (not shown). The subsequent screen decision means, for instance, can be realized by executing a program stored in RAM 24 by processor 21. Or, it can be realized by the hardware or firmware capable of performing these functions.

The situation in which the cover is closed and the TELEPHONE status 43 is in STAND BY status 33 is explained first.

Transition table 42 is scanned first to find a line indicating TELEPHONE status 43 is in STAND BY status 33. Then transition condition 44 on the line firstly found is checked. In the example in FIG. 14, because it says USER SETTING, user information 46 of FIG. 15 is scanned. The example of FIG. 15 shows "-" for subsequent screen 48, indicating that no setting has been made for TELEPHONE status 47 at STAND BY status 33. The scan, therefore, was a failure, and transition table 42 shown in FIG. 14 is referred again. Then, transition condition 44 for the next line showing the STAND BY status 33 in the column of the TELEPHONE status 43 is checked. Because transition condition 44 for the example in FIG. 14 says HISTORY SETTING, historical information 49 given in FIG. 16 is scanned. In historical information 49, an item indicating the STAND BY status 33 in the column of the TELEPHONE status 51 in the cover closed status is at STAND BY 33, and that transition direction 52 is "->", indicating the transition toward the cover opened status is scanned. The scanning is conducted in the direction from the bigger history number toward the smaller number. In this situation, history No. 9 is not scanned because it stands for the current situation. The first item that satisfies the condition is history number 50 "5". Because screen 33 at this time is SCHEDULE screen 40, SCHEDULE screen 40 is determined to be the next screen to be displayed.

There is a method different from the above description of determining the screen by scanning historical information 49 of FIG. 16. It is also possible to determine a screen with the most frequent appearance as the subsequent screen by picking up screen 53 indicating "-" for transition direction 52 showing the STAND BY status 33 in the column of the TELEPHONE status 43. The example in FIG. 16 shows MEMO screen 39 twice and SCHEDULE screen once, thus MEMO screen 39 is determined to be the screen to display in this method. In this method, because the most recent screen is not selected, but because the most frequent subsequent screen up to that point is selected, the determination of subsequent screen becomes more proper.

The situation in which TELEPHONE status 43 is TALKING status 35 with the cover closed status is explained next.

Transition table 42 is first scanned to find a line indicating the TALKING status 35 in the column of the TELEPHONE status 43. Transition condition 44 for the line first found is checked. Because the example in FIG. 14 says USER SETTING, user information 46 of FIG. 15 is scanned. The example of FIG. 15 says "", which indicates that a setting has not been made for transition screen 48 showing the TALKING status 35 in the column of the TELEPHONE status 47. Therefore, this scan is a failure, and transition table 42 of FIG. 14 is referred again. Then, the next

transition condition 44 showing the TALKING status 35 in the column of the TELEPHONE status 43 is checked. Because CORRESPONDING TALK LOG is indicated in this example, talk log information shown in FIG. 17 is scanned. If, for instance, the type of the on-going telephone talk is telephone transmission, and the phone No. is (0467) 12-3456, talk log information 54 is scanned sequentially from the latest log to find a line indicating that the TYPE is O, and PHONE No. is (0467) 12-3456. In the example of Fig. 17, the line that says KIMURA WATCH for opposite party 58 is found in the Figure. Then, because the column of subsequent screen type 60 is ADD, the transition screen is determined to be ADDRESS BOOK screen 41.

The data to be displayed on the subsequent screen in this case could be by the date pointed to by the address "0120" indicated by pointer 59 corresponding to subsequent screen type 60 "ADD". It is also possible to find the subsequent screen with the same talking type (phone, fax, etc.) but in the direction opposite to the stored talking direction TRANSMISSION or RECEPTION, and with the same telephone number as the current talk. Or irrespective of the phone, face, etc., it is possible to find the subsequent screen only in the direction opposite to the stored talking direction. Likewise, it is also possible to find the latest subsequent screen with the same telephone number as the one currently in use. In either case, it is advantageous because the data concerning the previous talk with the opposite party can be promptly seen. There are various methods to decide the subsequent screen depending on the previous talk activity with the opposite party.

If there is no line that matches the condition or if the subsequent screen type 60 is "-", even if the line is existent, the scanning is a failure and transition table 42 shown in FIG. 14 is referred again. Then, the next line indicating TALKING status 35 in the column of the TELEPHONE status 43 is checked under TRANSITION CONDITION 44. Because TRANSITION CONDITION 44 in the example of FIG. 14 says HISTORY SETTING, historical information 49 shown in FIG. 16 is scanned. The procedure after that is the same as above. If the line matching the condition exists, but if subsequent screen type 60 is nonexistent, showing "-", the scanning condition can be changed among the various methods to make re-scanning possible.

A situation in which TELEPHONE status 43 is at TELEPHONE DIRECTORY OPERATING status 36 with the cover closed status is explained next.

Transition table 42 is first scanned to find a line showing TELEPHONE DIRECTORY OPERATING status 36 in the column of the TELEPHONE status 43. Transition condition 44 of the line first found is checked. Because it says USER SETTING in the example of FIG. 14, user information 46 of FIG. 15 is scanned. Because subsequent screen 48 showing TELEPHONE DIRECTORY OPERATING status 36 in the column of the TELEPHONE status 47 says the TALK LOG status 38, the subsequent screen is determined to be the TALK LOG screen 38.

Although the only possible screen to be displayed in FIG. 13 is the ADDRESS BOOK screen 41 for the TELEPHONE DIRECTORY OPERATING status 36, the screen is changed to the TALK LOG screen 38 in the above case. This is because the user has set the subsequent screen. FIG. 13 represents the candidates of system-provided subsequent screens. If the setting has been made by the user, it is prioritized. The subsequent screen can always be determined even when the matching transition condition is not found. Even if no matching transition condition is found, FIG. 14

indicates a screen change to the ADDRESS BOOK screen 41 for the STAND BY screen 33, to the TELEPHONE screen 37 for the DIALING screen 34, to the MEMO screen 39 for the TALKING screen 35, and to the ADDRESS BOOK screen 41 for the TELEPHONE DIRECTORY OPERATING screen 36, respectively.

It is also possible to select the subsequent screen based on the user information, historical information, or talk log information without referring the transition table. The user information, historical information, and talk log information can be used independently.

This Embodiment therefore improves operability besides ensuring the certain size of the display screen by mechanically adopting a liquid crystal tablet with combined display and input operation. Moreover, the use of a slide cover improves operation, allowing the user to open or close the cover easily with one hand even during talk.

Functionally, a telephone call can be made even when the cover is open, thus the number of operations for opening/closing the cover is reduced. Furthermore, it is easy to use because the user can use it by selecting the preferred status (the cover opened or closed status) depending on the use conditions and environment in using as a telephone set.

Moreover, when the cover is opened, the screen is displayed in accordance with the historical information, operation situation in conjunction with the cover opening/closing, user setting, and so forth. Thus the number of operations is reduced and the waiting time until the desired screen appears can be shortened. Therefore, functions for the electronic note, word processor, personal computer, etc., can be easily employed even during telephone talk, with improved operability.

In addition, the Embodiment offers convenience because the data can be linked based on the historical information of the operation on the basis of the talk log, the desired data can be easily obtained with fewer operation steps.

In this way, by determining the subsequent screen to be displayed when the cover is opened according to the historical information, operation situation (talk log for the telephone set, as an example), user setting, etc., the number of operation steps until the desired screen can be obtained is reduced, and the waiting time until the desired screen appears is shortened, the operability improves.

#### Embodiment 2

The mobile information terminal equipment of this Embodiment is explained next referring to FIGS. 19 and 20.

The mechanical configuration of the mobile information terminal equipment is explained with FIG. 19 and FIG. 20.

FIG. 19 and FIG. 20 are the front views showing the appearance of the mobile information terminal equipment. FIG. 19 is a front view with cover 7 in the closed status, and FIG. 20 is a front view with cover 7 in the opened status.

In FIG. 19 and FIG. 20, a window 65 is shown. Window 65 is constructed either by cutting out cover 7 or by applying a transparent material. The displayed information inside the window 65 on liquid crystal display 4 can be seen with cover 7 in the closed status (FIG. 19).

For the mobile information terminal equipment, cover 7 and mobile information terminal equipment body 1 overlap along the plane parallel to the plane of the front view, in the cover closed status, and are coupled with hinge 19. In opening the cover, cover 7 rotates until it overlaps the rear surface of mobile information terminal equipment body 1 with the hinge as the pivot. Because telephone keyboard 6

23

is attached to cover 7, it is advantageous in making liquid crystal display 4 and touch screen 20 relatively larger compared with the mobile information terminal equipment described in Embodiment 1. Therefore, this Embodiment offers improved operability. However, for the cover opening/closing operation, operability is somewhat less desirable compared with the one described in Embodiment 1 when the mobile information terminal equipment is operated with the hand holding it. For the electrical configuration, the explanation is omitted because it is the same as FIG. 3 described for Embodiment 1.

The operation for the cover closed status is explained next with FIG. 21 and FIG. 22, specially centering on the user interface.

The difference in display from the mobile information terminal equipment described in Embodiment 1 lies in that the content is turned by 90 degrees rightward on the screen. This is because, mechanically, window 65 is placed at the upper part of the liquid crystal display 4 and touch screen 20 in FIG. 20. Other explanation is omitted because it is the same as those explained for Embodiment 1. The explanation for the operation in the cover opened status is also omitted for it is the same as that of Embodiment 1.

The subsequent screen for transitioning from telephone mode (the cover closed status) to information terminal mode (the cover opened status) is explained next.

As explained in Embodiment 1, the screen that appears upon cover opening can be determined by historical information, operation situation (TELEPHONE status), user setting (user information), and so on. It is also possible to fix the subsequent screen. This embodiment is used to provide an explanation for fixing the subsequent screen for transitioning from telephone mode to information terminal mode. This embodiment is advantageous for cost cutting and for simplifying (down-sizing) the equipment because the memory amount and processing amount can be reduced.

The subsequent screen could be 1) always an initial screen, 2) always the TELEPHONE status 37, 3) always user set screen, and 4) the immediately preceding screen when the cover was closed most recently. Another possible way is to 5) prioritize the user setting, and if there is no user setting, adopt either the screen of 1), 2) or 4) mentioned above.

The above-mentioned case 1) can be realized by resetting the system every time the cover is opened or closed (the initialization or release of unnecessary area such as work area in RAM 25 and the initialization of programs executed by processor 21). The above case 2) can be realized by activating the processing module of the TELEPHONE screen after processing the case 1). For the above case 3), the user sets one subsequent screen on the transition table irrespective of the TELEPHONE status. After processing the case 1), a screen can be changed to the one set on the transition table. For the above case 4), the system status can be always maintained irrespective of the cover opening/closing. For the above case 5), by checking whether the user setting has been made, and if there is the user setting, the above case 3) is performed, and if there is no user setting, either case 1), 2), or 4) can be performed.

It is also possible for the mobile information terminal equipment in Embodiment 1 to fix the subsequent screen as has been explained.

### Embodiment 3

The method of determining the subsequent screen from telephone mode (the cover closed status) to information terminal mode (the cover opened status) has been explained

24

in Embodiments 1 and 2. Conversely, the subsequent TELEPHONE status and the display data to be displayed on the display screen can be linked with the transition from information terminal mode (the cover opened status) to telephone mode (the cover closed status). With reference to FIG. 23 through FIG. 29, the determination of subsequent TELEPHONE status and the creation of display screen when transitioning from the cover opened status to the cover closed status are explained below.

FIG. 23 is a figure indicating the candidates of the TELEPHONE status for each screen when transitioning from the cover opened status to the cover closed status.

When the screen immediately before closing the cover is the TELEPHONE screen 37, the TELEPHONE status could be either the STAND BY status 33, DIALING status 34, or TALKING status 35 after the cover is closed. On the TELEPHONE screen displayed in FIG. 12, when characters such as numerics, etc., are not displayed on telephone number display window 32, e.g., when there is no input, it transits to the STAND BY status 33. When characters such as numerics, etc., are displayed in telephone number display window 32 shown in FIG. 12, e.g., when the telephone number has been input, and if the send button S is not touched, it transits to the DIALING status 34. Further, when characters such as numerics, etc., are displayed in telephone number display window 32, e.g., when the telephone number has been input, and if the send button S is touched, it transits to the TALKING status 35.

When the screen immediately before closing the cover is the TALK LOG screen 38, the TELEPHONE status could be STAND BY status 33 or DIALING status 34 after the cover is closed. On the TALK LOG screen shown in FIG. 11, when a specific line is touched or double touched, e.g., a specific log is selected, it transits to the DIALING status 34. On the TALK LOG screen shown in FIG. 11, when a specific line is not touched at all, e.g., when no specific log is selected, it transits to the STAND BY status 33. When the cover is not closed after a double-touch, it transits to the TELEPHONE screen 37. In order to avoid dialing a wrong number, it does not directly transit from the TALK LOG screen 38 to TALKING status 35 so as to enable the user to confirm the telephone number. In order to transit to the TALKING status 35, after the TELEPHONE screen 37 appears, the send button S shown in FIG. 12 is touched (telephone talk is enabled irrespective of the cover opened/closed in this case), or after the cover is closed, the send key S shown in FIG. 1 is pressed.

When the screen immediately before closing the cover is the MEMO screen 39 or SCHEDULE screen 40, the TELEPHONE status after the cover is closed is only the STAND BY status 33. This is because the functions of the MEMO screen 39 and SCHEDULE screen 40 are not directly linked with the telephone functions. Therefore, when the cover is closed on the SCHEDULE screen shown in FIG. 8 and FIG. 9, and on the MEMO screen shown in FIG. 10, it transits to the STAND BY status 33.

When the screen immediately before closing the cover is the ADDRESS BOOK screen 41, the TELEPHONE status after the cover is closed could be either the STAND BY status 33, DIALING status 34, or TELEPHONE DIRECTORY OPERATING status 36. On the ADDRESS BOOK screen of FIG. 6, when a specific line is touched or double touched, or when the ADDRESS BOOK screen 16 is displayed, e.g., when a specific name is selected, it transits to the DIALING 34 status just as the case for the above TALK LOG screen 38. On the ADDRESS BOOK screen of

FIG. 6, if a specific name is selected, the home telephone for that name is automatically selected, and if the home telephone is not set, the office phone is automatically selected. The user can set the unit to give a home phone the precedence over an office phone, and vice versa.

When no specific line is selected on the ADDRESS BOOK screen of FIG. 7, or when a name line is selected, a selection similar to the above is made. The user can set the home phone to be selected when the line of home address or home phone is selected, and the office phone to be selected when the line of the company name, department and position, office address, or office phone number is selected. In either case, if the cover is opened after a double-touch, the TELEPHONE screen of FIG. 12 appears, and the call number (telephone number) selected is displayed at telephone number display window 32. If the cover is closed after a touch or double-touch, the call number (telephone number) selected is displayed in the visible area of liquid crystal display 4 shown in FIG. 1.

When the cover is closed after a touch or double-touch, a display screen shown in FIG. 5 appears and it transits to TELEPHONE DIRECTORY OPERATING status 36. Then, for instance, by operating the roll key U or D, the call numbers stored in the address book adjacent to the displayed call number are displayed in the visible area on liquid crystal display 4 shown in FIG. 1, and pressing the send key S allows the user to talk to the opposite party corresponding to the displayed call number.

FIG. 24 through FIG. 29 illustrate examples of the above operation.

FIG. 24 indicates that the telephone number is being input. On the TELEPHONE screen in the cover opened status, the telephone number "04671234" is being input manually. When the cover is closed in this status, as in FIG. 25, the input telephone number "04671234" 66 is displayed in the visible area on liquid crystal display 4 shown in FIG. 1. Then, by operating telephone keyblock 6 of FIG. 1, the telephone number can be input. Therefore, the input in the cover opened status is not wasted, thus operability is improved.

FIG. 26 shows the TELEPHONE screen displayed after the uppermost line (the line which says WATANABE CONSTRUCTION) on the TALK LOG screen shown in FIG. 11 is double touched. Therefore, the corresponding telephone number "(0467) 12-3456" is displayed on telephone number display window 32. When the cover is closed in this status, as in FIG. 27, the telephone number "(0467)-12-3456" 68 and the corresponding opposite party (WATANABE CONSTRUCTION) 67 are displayed in the visible area on liquid crystal display 4 shown in FIG. 1. After that, talk is enabled by pressing the send key S of FIG. 1. Therefore, there is no need of inputting the telephone number again after the cover is closed, and the operability is improved.

FIG. 28 indicates the situation in which the HOME PHONE line on the ADDRESS BOOK screen shown in FIG. 7 is touched. When the cover is closed in this situation, as in FIG. 29, the telephone number "(0467)-11-2222" 70 and the corresponding opposite party (MATUURAJIRO) 69 are displayed in the visible area on liquid crystal display 4. In this case, the TELEPHONE DIRECTORY OPERATING status 36 is also valid, and TEL.NO.SEARCH 16 indicating the status (mode) is displayed in the visible area on liquid crystal display 4 of FIG. 1. After that, the adjacent telephone numbers stored in the ADDRESS BOOK are searched and displayed by operating the roll key "U" or "D" of FIG. 1, and

the telephone talk is enabled by pressing the send key S. This is the case that the retrieval has been completed close to the desired opposite party than the desired opposite party searched manually. Thus operability is improved since the retrieval of the telephone number after the cover is closed becomes easy.

In retrieving the telephone number stored in the ADDRESS BOOK by operating the above roll key "U" or "D", because the opposite party may have several telephone numbers (for instance, home phone and office phone, etc.), there are cases that the user wants to retrieve one of the telephone numbers belonging to the opposite party. Therefore, it is also possible to retrieve the opposite party by simply operating the roll key "U" or "D", and to retrieve one of the telephone numbers of the displayed opposite party, by pressing the "#" key first, and then by operating the roll key "U" or "D".

When the address book is retrieved in the cover opened status, by storing the historical information, it is possible that the retrieval can be implemented in historical order in the cover closed status. For instance, if the "\*" key is pressed, and then the roll key "U" or "D" is operated, the opposite parties on the screen are not displayed in the order stored in the ADDRESS BOOK, but the ADDRESS BOOK data can appear according to the order retrieved in the cover opened status. This improves the operability because the data being retrieved often is displayed first, thus the key operation is reduced.

FIG. 30 shows an example of the data format of the ADDRESS BOOK stored in RAM 25.

FIG. 30 is provided with the historical information concerning the address book retrieval. The data described in the figure corresponds to the ADDRESS BOOK screen shown in FIG. 6 and FIG. 7. For the example of FIG. 30, one data block (record) consists of 10 items, a name 71 of Japanese Kanji characters and Roman characters, a home address 72, a home phone 73, a home fax 74, a company name 75, a department & position 76, an office address 77, an office phone 78, an office fax 79, and forward and backward pointers 80.

When the ADDRESS BOOK is retrieved in the cover opened status, the top address(es) of the preceding and/or succeeding data blocks are stored in the column of forward and backward pointers 80 of FIG. 30 as the historical information. After pressing the "\*" key, and when the roll key "U" or "D" is operated, the address book data can be displayed according to the retrieved order in the cover opened status by following the pointer.

The mobile information terminal equipment shown in FIG. 1 and FIG. 2 explained in Embodiment 1 has been described to this point. In transiting from information terminal mode to telephone mode, the same description applies to the mobile information terminal equipment of FIG. 19 and FIG. 20 of Embodiment 2.

#### 55 Embodiment 4

In the above Embodiments, the methods for determining the subsequent screen and the subsequent TELEPHONE status concerning the opening/closing of the cover have been explained. However, the display screen becomes smaller in the cover closed status compared with the cover opened status. Therefore, in order to display the data obtained in the cover opened status in the cover closed status, the data on the display screen in the cover opened status must be selected to be displayed in the cover closed status.

FIG. 30 shows the data format of the ADDRESS BOOK stored in RAM 25.

In FIG. 30, items to be displayed in the cover closed status are stored in the first data block (record). In this example, the items indicated with [ ], name 71 and home office 73, are the items to be displayed. With name 71, because the description says ONLY IN ('), only the name of the Roman characters are displayed. With home phone 73, because "" is described, all data for the item are displayed. When the cover is closed on the screen shown in FIG. 28, the information is selected and then displayed just as the screen shown in FIG. 29.

For some application (service), questions or input requests from the server to the mobile information terminal are made by outputting voice or a brief message from the screen to the mobile information terminal, and then responses to the server are made by inputting from the telephone keyboard of the mobile information terminal in telephone mode. For the same application (service), in information terminal mode, questions or input requests are made from the server to the mobile information terminal by displaying the application screen on the mobile information terminal and the reply from the mobile information terminal to the server are made by selecting an item on the displayed application screen or by hand-writing in the designated area. A mobile information terminal equipment capable of performing such functions for one application is explained below.

The cover closed status is fundamentally the TELEPHONE status. Therefore, for instance, to make a seat reservation by calling a train company, it is easier to receive voice instructions, and then respond by pressing telephone keyboard 6. However, in the cover opened status, because the screen is large, it is easier to input with a pen to the screen on which items to be input are displayed in a fill-in-the-blank format. With FIG. 31, a method of selecting information on the screen display in the cover closed status and a method of changing the response depending on the cover opened/closed status are explained below.

FIG. 31 shows an example of an application screen for the seat reservation using the telephone line or data communication line.

In the cover opened status, when a telephone call is made to a railway company, a telephone number database (not shown) is retrieved, and a matched application is automatically activated by the system. In this example, an application of JAPAN RAILWAY COMPANY SEAT RESERVATION is activated. The user fills in necessary information in the  columns with a pen. For instance, when the user hand-writes numbers directly with a pen in the MONTH and DATE column, the numbers are character recognized and then coded. For the TRAIN NAME column, first touch the TRAIN NAME and then touch MA in tag area 28. Then a window 81 appears, displaying train names beginning with ma, mi, mu, me, and mo. If the MIRAI is touched, for instance, it appears on the column right to the TRAIN NAME. When train number 501 is directly written with a pen, the number is character recognized and then coded.

For the SEAT TYPE column, when the SEAT TYPE is touched, a window 82 appears, displaying the type menu. If the user touches PRIVATE and then SLEEPING CAR, PRIVATE SLEEPING CAR is displayed in the seat type column. After necessary information has been input (filled in blanks), the TRANSMISSION button is touched to make the system send the input data by calling the pertinent railway company. If the railway company has both the data communication line and the telephone line, data transmission is performed via the data communication line. If only tele-

phone line is available, input data is converted into the DTMF (Dual Tone Multi-Frequency) tone, and then transmitted according to the voice instruction.

In the cover closed status, when a telephone call is made to the railway company (after the telephone number is input, the send key S is pressed), the system performs call-out processing, and after the line is connected, the user inputs necessary information through the key operation according to the voice instruction. In the cover opened status, on the other hand, after a telephone call operation is made to the pertinent railway company (after the telephone number is input, the send button S is touched), the system activates the application without performing actual call-out processing. After the TRANSMISSION button is touched in the application, the actual call-out processing is performed and the data transmission starts when the line has been connected.

The application of making a seat reservation to a railway company is explained above. The method is also applicable to making a seat reservation to a theater, or an airline company. It is also possible to send certain forms of information, such as the registration to a government office, etc., to a company or an organization.

Depending on the cover opened/closed status, a suitable user interface can be used. In the cover opened status, a visual user interface can be used and the communication charge can be lowered. The user can freely select the cover closed/opened status depending on the situation.

#### Embodiment 5

The linkage method of the subsequent screen in connection with the cover opening/closing has been explained in the above Embodiments. During the cover opened status, the subsequent screen can be determined using the historical information in a similar manner, and the desired screen appears with fewer number of operations.

Although the cover closed status is assumed to be telephone mode and the cover opened status to be information terminal mode in the previous Embodiments, it is possible to use the cover closed status as information terminal mode by limiting the functions. For instance, by displaying the data book in telephone mode, it is possible to set information terminal mode in the cover closed status.

#### Embodiment 6

This Embodiment explains about the user interface and communication control of a terminal having combined functions of a mobile telephone and a personal information management. The structural features of the terminal are first explained.

In FIG. 32, which shows a front view of the mobile information terminal equipment of this Embodiment in the cover closed status, a mobile information terminal equipment body 201, a door 202 attached to mobile information terminal equipment body 201 with a hinge 205, and a display window 204 and a switch button 203 attached to door 202 are illustrated.

FIG. 33 is a front view of the mobile information terminal equipment in the door 202 opened status.

In the figure, a cover detect switch (a means for detecting the door opened/closed) 207 detects the opened/closed status of door 202, and a touch screen 206 makes a contact with switch button 203 when switch button 203 is pressed.

FIG. 34 is a cross sectional view of the mobile information terminal equipment of this Embodiment with the door closed.

In the figure, the part with which switch button 203 contacts touch screen 206 is formed with a soft rubber (elastic material) having some area. Switch button 203 is supported by a support 209 attached to door 202. On the bottom of touch screen 206, a display unit 210 is installed contacting with touch screen 206.

FIG. 35 shows the appearance of the mobile information terminal equipment of Embodiment 6 for using as a mobile telephone, and FIG. 36 shows a status using it mainly as a portable personal information management apparatus.

In the figure, a microphone 212, and a speaker 213 are shown.

For using the equipment as a mobile telephone with the door closed, because it is generally easier to use the body holding vertically, characters or pictograms are also set to be displayed vertically. When using it as a mobile telephone with door 202 closed, if switch button 203 attached to door 202 is pressed, an input is interpreted as a dialing operation, and the pressed numbers are displayed at the location in the display window where the user can see.

For using the equipment as a portable personal information management apparatus, because information in schedule book or address book, received mail, or user memo, etc., are often retrieved, it is generally easier to use body 201 while holding the unit horizontally, with a horizontally wide display. Therefore, characters are displayed in the vertical direction on a horizontally wide display, e.g., they are controlled to be displayed in the direction 90 degrees different from the display in the door 202 closed status.

Methods of displaying characters are explained using the explanatory figures of FIG. 37 to FIG. 41.

With body 201 in the vertically placed status, from point a of FIG. 37, characters are displayed one after another until they reach point b. Then, the line is scrolled to the next line, and when characters reach the final column of that line, the line is again scrolled on to the next line, and this is repeated sequentially. With body 201 in the horizontally placed status, characters are displayed one after another from point a toward point b of FIG. 38. When the characters reach the last column of that line, the line is scrolled to the next line, and this is repeated sequentially. Because the character bit mapping data used for the display with body 201 in the vertically placed status is not suited for the display with body 201 in the horizontally placed status, as in FIG. 39, a bit mapping data different from the character bit mapping data used for the display with body 201 placed in the vertical position is used for the display with body 201 placed in the horizontal position. By using a different bit mapping data for body 201 in the vertical and in horizontal positions, the display shown in FIG. 40 is realized for body 201 in the vertically held condition and the display in FIG. 41 is realized for body 201 in horizontally held condition.

The method of switching the display according to the closing/opening of the door is explained below.

FIG. 42 is a block diagram showing the configuration of Embodiment 6 of the present invention.

In the figure, a control unit 231, a microphone 212, a radio unit 232, a speaker 213 for outputting voice signals during operation, and effect/warning sound, etc., during operation, an audio interface (I/F) circuit 235 for converting analog/digital (A/D) voice signals, a sound signal switch unit 236 for switching input/output path of the voice signal in talk and in generating effect/warning sound stored in memory, a modem unit 237 for implementing data communication, a liquid crystal display (LCD) 238 for displaying a screen, a

touch screen 206 for detecting a user's touch input, and a touch location information 203A obtained indirectly by pressing switch button 203 of door 202 are shown.

Control unit 231 controls the display screen of the user interface for the door closed/opened status, using the touch location information from touch screen 206 and the switch status information from cover detect switch 207.

An example of screen display in the door 202 closed status is shown in FIG. 43.

The screen consists of three basic lines. On the top line, information the user needs before making a phone call, such as time, radio field strength, etc., are displayed. On the second line, the telephone number, etc., input when the user starts the dialing operation are displayed. On the bottom line, message display, error display, etc. necessary for the operation are displayed. Because the example in FIG. 43 shows an idle status immediately after power on, the time and field strength information are displayed on top.

When door 202 is closed, the mapping of touch input is carried out according to switch button 203 of door 202. When the user presses switch button 203 of door 202, a key selected based on the touch location information 203A indirectly obtained is determined to control the user interface.

FIG. 44 shows the dial operation screen in the door 202 closed status.

FIG. 45 shows an example of screen display in the door 202 opened status.

The telephone functions of the mobile information terminal equipment of this Embodiment can be used even when door 202 is opened. FIG. 45 shows the dial operation screen when the door is open. On the screen of FIG. 45, the ten-key button for inputting the dial number and the address book button for activating an electronic telephone directory function among the personal information management functions, etc., are graphically displayed.

The mapping of touch input for the door 202 opened status is performed according to the Graphic User Interface (GUI). The user operates by directly touching the buttons and icons displayed on the screen.

The display switching procedure according to the opening/closing of the door is explained with a flowchart shown in FIG. 46.

FIG. 46 is the flowchart showing the operation flow of an interrupt processing program in control unit 231 to handle an interrupt from the cover detect switch 207.

When the user status of cover detect switch 207 is changed, an interrupt is generated and the program starts (step S10). The program reads the switch status from the input port to determine whether door 202 is closed or opened (step S20). When door 202 is closed, the program activates a user interface program (step S30) of performing the screen display control for closing the door. When door 202 is opened, the program activates a user interface program for performing the screen display control for opening the door. The door opened/closed status can be determined at step S20 simply with the interrupt reception, if the previous door status is stored in the program.

The user interface programs for the door closed and opened status can be configured as two independent software modules, because, as explained previously, they are activated by the interrupt processing program for the cover detect switch 207, respectively. However, because it is possible for the mobile information terminal equipment of this Embodiment to make a telephone call both in the door

202 closed and opened statuses, if the user opens or closes door 202 during dialing operation, it is necessary to enable the continuous input operation. Although there are two independent software modules which control the screen display, the information concerning the telephone operation such as dial data, etc., is shared between the modules so that the identical data is to be accessed. The shared data can be safely used from the two independent software modules by controlling the access authority for writing using semaphore, and so on. The safe use of the shared data can be also realized by providing a special software module for controlling the information regarding the telephone operation, wherein the special software module provides a function to access the shared data.

An example of opening/closing door 202 during telephone talk after the telephone dial operation is finished is explained next.

When talking over the telephone in the door 202 closed status, usually microphone 212 is placed close to the user's mouth and speaker 213 is put close to the ear. In order to retrieve SCHEDULE, etc., using the personal information management functions while talking, when the opening of door 202 is detected during talk, a control is performed so as to enable hand-free talking, i.e., the sensitivity of microphone 212 and output level of speaker 213 is increased so that the talking can be carried on without having them close to the mouth or the ear.

To send SCHEDULE data or received mail, etc., to the opposite party while talking, telephone mode is switched to data transmission mode by selecting the transmission button displayed on the SCHEDULE or MAIL screen. Control unit 231 instructs voice signal switch unit 236 to temporarily shut down the path from microphone 212 to radio unit 232, and validates the path from modem 237 to radio unit 232 in order to switch the line from telephone to modem for the data transmission. In such a situation, because the switching of line to the modem must be performed both on the transmission side and the receiving side, some corresponding operation must be performed on the receiving side. However, because telephone talking is already going on with the opposite party, the transmission side can provide the timing of starting data transmission over the telephone. Because the timing of ending data transmission can be mutually confirmed during data transmission procedure, telephone mode is automatically resumed.

According to this Embodiment, the display window and the door having the switch button are provided for a main body. The detector is provided for detecting the opening/closing the door, and the separate software modules control the user interface for using the equipment as a telephone in the door closed status and for using the information processing functions in the door opened status. Therefore, the screen display is optimized for the door closed status and the door opened status. When the cover is opened, because the entire large-size display is used and operated with the graphic user interface (GUI), addition of physical buttons is unnecessary even when the information processing functions are expanded. Thus, the cost and the size of the apparatus can be reduced.

#### Embodiment 7

As one Embodiment of the present invention, a portable electronic apparatus having a slide cover for the input display unit is explained. The portable electronic apparatus of Embodiment 7 is, for instance, the mobile information terminal equipment described in the previous Embodiments

1 through 6. Or, it can take a different form of a portable electronic apparatus.

In FIG. 47 and FIG. 48, a portable electronic apparatus body 301, a slide cover 302, an input display unit 303, a rail 304 furnished with portable electronic apparatus body 301, a slide projection 305 of slide cover 302 which engages with rail 304, switches 306, a switch panel 319 with allocated switches, and a front face 320 allocated with input display unit 303 and switch panel 319.

FIG. 47 shows the condition with slide cover 302 closed. FIG. 48 shows the condition with slide cover 302 opened.

The operation is explained next.

Holding the portable electronic apparatus body with one hand as shown in FIG. 47, slide cover 302 can be opened or closed by sliding it up and down along the body. Furthermore, input display unit 303, switches 306, and rail 304 are allocated in such a manner that switches 306 are hidden and protected when the slide cover is opened.

The configuration thus enables the user to open/close the slide cover easily. Moreover, when the input display unit is exposed as the slide cover is slid down, the switches becomes hidden, thus preventing the user from pressing the switches inadvertently.

FIGS. 49A and 49B show other examples of portable electronic apparatus.

An input display unit 307, long and narrow support projection 308 and cone-shaped support projection 308a provided among switches on the portable electronic apparatus body 301, contact surfaces 309 provided for slide cover 302 which makes contact with support projections 308 and 308a. By placing rail 304 at the outside of input display unit 303 of display device 307, in the area 321 above the frame of input display unit 303, as in FIGS. 49A and 49B, the hinge previously required for opening/closing the cover, or the additional width required at the rail become unnecessary. Thus the width W of the main body can be reduced.

The width of portable electronic apparatus body 301 is shortened as much as possible. Operability improves because it becomes easier to hold the body with one hand.

As shown in FIGS. 49A and 49B, long and narrow or cone-shaped support projections 308 and 308a are provided among switches 306 of portable electronic apparatus body 301 and contact surfaces 309 are provided for slide cover 302 which makes contact with support projection 308. The force indicated by the imaginary line from top of the slide cover 302 is received at support projections 308 and 308a via contact surfaces 309 without bending the slide cover 302 and without pressing switches 306 at the same time. Even if an excessive force should be erroneously added to the slide cover, the slide cover would not be broken and the switches would not be pressed, which helps improve the durability and operability.

FIG. 50 shows part of the end of the rail.

A switch lever 310 is secured at the end of rail 304. An opening/closing mode switch 311 is set touching the switch lever.

According to the opening/closing operation of slide cover 302, switch lever 310 is pushed in the direction of arrow A, which causes opening/closing switch 311 to be pressed to turn the switch on/off. When this signal is detected, display mode is switched according to the opening/closing of the slide cover. Switch lever 310 is arranged in the rail groove so as to minimize malfunction of opening/closing switch 311.

As shown in FIG. 51, it is possible to remove part of slide cover 302 in such a manner that it would not diminish its

functions. By using input display unit 303 seen from cut-off part 312, a display screen that fits the small display seen from cut-off part 312 can be created and displayed. Conversely, when the slide cover is opened, a display screen using up the entire display surface can be used. It is also possible to design the slide cover such that it is partly transparent 313 instead of removing a portion as shown in FIG. 52.

The operation of the portable electronic apparatus is enabled even when slide cover 302 is closed. Moreover, by linking the opening/closing of slide cover 302 with opening/closing mode switch 311, versatile usage of the portable electronic apparatus is realized with improved functions and operability.

FIG. 53 shows the opening/closing support projections provided for slide cover 302 and rail 304.

Opening/closing support projections 314 are provided near the both ends of rail 304 of portable electronic apparatus body 301. Opening/closing support projections 315 are attached on slide projection 305 of slide cover 302 and located vis-à-vis opening/closing support projections 314.

According to the opening/closing of slide cover 302, opening/closing support projections 314 and 315 touch and click with each other. Because the projections work as obstacles for each other, the locations of slide cover 302 and rail 304 stay unchanged, maintaining slide cover 302 in its opened or closed location.

FIG. 54 shows a projection different from opening/closing support projections 314 and 315, to prevent the slide cover from falling off the body.

In the figure, a projection 316 for preventing the slide cover from falling off the body is attached to one end of rail 304. The cross section of projection 316 is indicated in FIG. 55.

The cross section of projection 316 for preventing the slide cover from falling off the body shows that one end of the projection has a relatively loose grade angle insert A, so that slide projection 305 of slide cover 302 coming from the left is able to surmount it while the other end has a steep grade angle B, close to right angle, so as to become an insurmountable obstruction blocking the slide projection 305 that leans from the right.

At the initial stage when the slide cover has not been mounted yet, slide cover 302 is inserted into rail 304 of portable electronic apparatus body 301 in the direction approaching grade angle A and then mounted. After that, when slide cover 302 is opened, it nears the obstruction at grade angle B. However, slide cover 302 does not move because it is blocked by the wall at grade angle B of projection 316, unless abnormally destructive force is involved.

Due to opening/closing support projections 314 and 315, slide cover 302 is kept on the rails as it is opened or closed. The operation is secured by the clicking of the projections. Projection 316 for preventing the slide cover from falling off prevents slide cover 302 from falling off portable electronic apparatus body 301 during operation. Therefore, the operability of the portable electronic apparatus is improved.

FIG. 56 shows the shape of a slide cover.

FIG. 57 shows its cross section.

A slide support projection 317 is attached inside slide projection 305 contacting rail 304 of portable electronic apparatus body 301, and provides a resistance against slide cover 302 during its opening/closing.

Convex surfaces 318 on the slide cover 302 are furnished in such a manner a user's fingers touch them when the

portable electronic apparatus is held in hand and provides a comfortable design.

In holding portable electronic apparatus body 301 in hand, slide cover 302 is opened/closed by feeling the convex surfaces 318 with your fingers. Slide support projection 317 allows slide cover 302 to move smoothly.

With convex surfaces 318 of slide cover 302 and with slide support projection 317, the slide cover can be easily and smoothly operated with your fingers, with the improved operability of the portable electronic apparatus.

This Embodiment has described the mounting structure of the slide cover provided for the protection of the input display unit, and which improves the operability of the portable electronic apparatus having a slide cover.

The portable electronic apparatus of this Embodiment has a rail on its main body. The slide cover covers the input display unit while it is closed and covers the switches when it is opened. The rail is arranged at the frame portion of the input display unit so that the main body does not get wider.

The support projection is attached to the main body and its contact is mounted on the slide cover. A switch detecting the opening/closing mode of the slide cover is provided on part of the rail. By making a cut out or a transparent window on part of the slide cover, functions can be improved even when the slide cover is closed. The opening/closing support projections that support the opened/closed position of the slide cover are provided, and the projection for preventing the slide cover from falling off the body is also attached. Furthermore, the slide support projections are also added so that the sliding operates smoothly.

The narrow width of the portable electronic apparatus of the present invention allows the user to handle the slide cover with one hand. In addition, it has such advantages as preventing inadvertent pressing of the switches. The slide cover is able to endure external force applied to it. Furthermore, mode functions can be added because the opening/closing of the slide cover can be detected. Also, the slide cover moves smoothly without falling off, maintaining the opened/closed position.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

What is claimed is:

1. A mobile information terminal comprising: a slideable cover that covers a part of a surface of said mobile information terminal equipment; said slideable cover having an aperture through which a portion of the surface of said mobile information terminal equipment is viewable even when said slideable cover is in a closed position, a detector for detecting whether said slideable cover is in an open position or a closed position; and a display control unit operatively connected to said detector, said display control unit controlling an input display unit to display the information in a landscape orientation when said slideable cover is in the open position, and in a portrait orientation when said slideable cover is in the closed position.

2. The mobile information terminal equipment of claim 1, further comprising:  
a display unit for displaying information on a display area in a part of the surface of said mobile information terminal equipment;  
a location detector for detecting a location of said slideable cover; and

- a display switch for changing a size of said display area and a display direction of information according to the location of said slidable cover detected by said location detector.
3. A portable electronic apparatus, comprising:
- an input display unit for inputting information and displaying information;
  - a key panel with switches;
  - a body with said input display unit and said key panel allocated on a front longitudinal surface thereof,
  - a slidable cover mounted on the surface of said body for opening/closing said input display unit;
  - a detector for detecting whether said slidable cover is in an open position or a closed position; and
  - a display control unit operatively connected to said detector,
  - said display control unit controlling said input display unit to display the information in a landscape orientation when said slidable cover is in the open position, and in a portrait orientation when said slidable cover is in the closed position,
  - wherein the landscape orientation has a longitudinal direction parallel with the longitudinal direction of said body, and
  - wherein the portrait orientation has a latitudinal direction parallel with the latitudinal direction of said body.
4. The portable electronic apparatus of claim 3, wherein said slidable cover selects one of said input display unit and said key panel and protects a covered other part of said body.
5. The portable electronic apparatus of claim 3, further comprising:
- a rail on said body for sliding said slidable cover.
6. The portable electronic apparatus of claim 5 wherein, said detector is a switch on said rail for detecting open/closed position of said slidable cover.
7. The portable electronic apparatus of claim 5, further comprising: an opening/closing support projection on said slidable cover and on said rail for keeping the slidable cover in its opened/closed position.
8. The portable electronic apparatus of claim 5, further comprising:
- a projection on said rail for preventing the slidable cover from falling off said body.
9. The portable electronic apparatus of claim 5, further comprising:

- a slide operation support projection on said slidable cover for making said slidable cover slide smoothly against said rail.
10. The portable electronic apparatus of claim 3, further comprising:
- a support projection on said surface of said body for supporting an inside surface of said slidable cover.
11. The portable electronic apparatus of claim 3, further comprising:
- a slidable cover shaped such that part of said input display unit is visible even when said slidable cover is in a closed position.
12. The portable electronic apparatus of claim 3, further comprising:
- a transparent part on said slidable cover.
13. The portable electronic apparatus of claim 3, further comprising:
- a plurality of convex projections on said slidable cover for facilitating a slide operation.
14. The portable electronic apparatus of claim 3 further comprising:
- said display control unit changing a size of said a display area and a size of the display information displayed by said input display unit.
15. A portable electronic apparatus comprising:
- an input display unit for inputting information and displaying information; a key panel with switches; a body with said input display unit and said key panel allocated on surface thereof, and;
  - a slidable cover mounted on the surface of said body for opening/closing said input display unit, a detector for detecting whether said slidable cover is in an open position or a closed position; and a display control unit operatively connected to said detector, said display control unit controlling an input display unit to display the information in a landscape orientation when said slidable cover is in the open position, and in a portrait orientation when said slidable cover is in the closed position, said slidable cover having an aperture through which a portion of said input display unit is viewable even when said slidable cover is in a closed position.
16. The portable electronic apparatus of claim 15 further comprising:
- a transparent material covering said aperture.

\* \* \* \* \*

**RELATED PROCEEDINGS APPENDIX**

None